PATENT ABSTRACTS OF JAPAN

(11)Publication number:

11-223821

(43)Date of publication of application: 17.08.1999

(51)Int.Cl.

G02F 1/1339 C08F292/00

(21)Application number: 10-147520

09188353

(71)Applicant: SEKISUI FINECHEM CO LTD

(22)Date of filing:

28.05.1998

(72)Inventor: MINAMINO HIROKO

TAKAHASHI TORU NAGAI YASUHIKO

(30)Priority

Priority number: 09335828

Priority date : 05.12.1997

Priority country: JP

14.07.1997

JP

(54) SPACER FOR LIQUID CRYSTAL DISPLAY ELEMENT AND LIQUID CRYSTAL DISPLAY ELEMENT USING THAT

(57)Abstract:

PROBLEM TO BE SOLVED: To add functions such as a preventing performance against abnormal orientation and an adhesive performance to a shell layer while maintaining the mechanical strength required for a spacer by reacting an oxidant with fine particles each having reducing groups on the surface to produce radicals on the particle surface and forming a polymer layer by using the radicals as the starting point on the particle surface. SOLUTION: An oxidant is reacted with fine particles each having reducing groups on the surface to produce radicals on the particle surface. Then polymerizable monomers are reacted by using the radicals as the starting point to form a polymer layer on the particle surface. As for the oxidant, for example, persulfates, cerium salt, hydrogen peroxide, dimethylaniline, sodium periodate, potassium permanganate and alkylboron and used. Further, an acid such as nitric acid or its salt may be added so as to increase the reaction rate of the polymer system. As for the reducing groups, for example, hydroxyl groups, thiol groups, aldehyde groups, mercapto groups and amino groups are used.

LEGAL STATUS

[Date of request for examination]

17.08.2000

[Date of sending the examiner's decision of

rejection]

[Kind of final disposal of application other than

the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

3333134

[Date of registration] 26.07.2002

[Number of appeal against examiner's decision

of rejection]

[Date of requesting appeal against examiner's

decision of rejection]
[Date of extinction of right]

• NOTICES •

JPO and IMPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original

** shows the word which can not be translated.

3.In the drawings, any words are not translated.

CONTRACTOR OF THE PERSON NAMED AND ADMINISTRATION OF THE PERSON OF THE P

CLAIMS

[Claim(a)]
[Claim(a)]
[Claim 1] The spacer for liquid crystal display components characterized by making an oxidizing agent react to the perticle which has a reducibility radical on a front face, making said particle front face generate a radical, and making it come with this radical as the starting point to form a polymerization layer in said particle front face.
[Claim 2] The spacer for liquid crystal display components according to claim 1 whose oxidizer is

a cerium salt.
[Claim 3] The spacer for liquid crystal display components cheracterized by making it come by
making an oxidizing agent react to the particle which has a reducibility radical on a front face,
making a said particle front face generate a radical, and making the polymerization nature monom

making said particle front face generate a radical, and making the polymerization nature monomer which has an epony group with this radical as the starting point react to form a reactant graft polymerization layer in said particle front face. (Claim 4) The spacer for fiquid crystal display components characterized by making it come by making an oxidizing agent react to the particle which has a reducibility radical on a front face, making said particle front face generate a radical, and making the polymerization nature monomer which has the polymerization nature monomer and ethylene glycol radical which have an epoxy group with this radical as the starting point react to form a reactant graft polymerization layer in said particle front face. said particle front face.

said particle front face.

[Claim 5] The spacer for liquid crystal display components characterized by making it come by making an oxidizing agent react to the particle which has a reducibility radical on a front face, making said particle front face generate a radical, and making the polymerization nature monomer which has a long-chain alkyl group with this radical as the starting point react to form in said particle front face the graft polymerization layer which has a long-chain alkyl group.

[Claim 6] The spacer for liquid crystal display components which is made to form in said particle front face the graft polymerization layer which has a functional group, and is further characterized by to make a long-chain alkyl compound come to react to the graft polymerization layer which has said functional group by making an oxidizing agent react to the particle which has a reducibility radical on a front face, making said particle front face generate a radical, and making the polymerization nature monomer which has a functional group with this radical as the starting point react.

making the polymerization nature monomer which has a functional group with unis reactal as the starting point react.

[Claim 7] By making an oxidizing agent react to the particle which has a reducibility radical on a front face, making said particle front face generate a radical, and making the polymerization nature monomer which has a functional group with this radical as the starting point react. The graft polymerization layer which has a functional group is made to form in said particle front face. Further By making the polymerization nature monomer which has an epoxy group react to it, after introducing the active group which has a polymerization nature vinyl group and/or polymerization initiation shiftly into the graft polymerization layer which has said functional group. The spacer for fluid orystal display components characterized by making it come to form the graft polymerization layer which has an epoxy group in the graft polymerization layer front face which has said functional group.

[Claim 8] By making an oxidizing agent react to the particle which has a reducibility radical on a

[Claim 8] By making an oxidizing agent react to the particle which has a reducibility radical on a

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje?u=http%3A%2F%2Fwww4.ipdl... 2007/02/02

front face, making said particle front face generate a radical, and making the polyr nature monomer which has a functional group with this radical as the starting point react The graft polymerization layer which has a functional group is made to form in said particle front face. graft polymerization layer which has a functional group is made to form in said particle front face. Further By making the polymerization nature monomer which has a long-chain alkyl group react to it, after introducing the settive group which has a polymerization nature viryl group and/or polymerization institation ability into the graft polymerization layer which has said functional group. The spacer for fauld crystal display components characterized by making it come to form the graft polymerization layer which has a long-chain alkyl group in the graft polymerization layer front face which has said functional group.

[Claim 9] The liquid crystal display component characterized by for two glass substrates with which the orientation film and a transparent electrode have been arranged countering through the spacer for facet front crystal display component according to them. 2, 3, 4, 5, 6, 7, or 8, and

the spacer for liquid crystal display components according to claim 1, 2, 3, 4, 5, 6, 7, or 8, and enclosing liquid crystal between said glass substrates.

[Translation done.]

JP.11-223821.A (CLAIMS)

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje?u=http%3A%2F%2Fwww4.ipdl..., 2007/02/02

· NQTICES ·

JPO and EMPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original

ws the word which can not be translated.

3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

iled Description of the Invention)

(Field of the Invention) This invention relates to the liquid crystal display component which used the spacer for liquid crystal display components, and it.

the spacer for liquid crystal display components, and it.

[0002]

[Description of the Prior Art] The liquid crystal display component in the Twistad Nematic (TN) mode using the conventional spacer The presumatic liquid crystal 11 enclosed between one pair of substrates 8 and 10, and these substrates 8 and 10 as shown in drawing 1, in order to make into a component the seal member 1 with which the perimeter of substrates 8 and 10 was filled up, and the polarization sheets 12 and 13 covered by the front face of substrates 8 and 10 and to hold uniformly the gap between the one above-mentioned pair of substrates 8 and 10, the spacer 9 is stranged between a substrate 8 and 10.

[0003] The above-mentioned substrates 8 and 10 form the pattern of the transparent electrodes 3 and 6 which become one side of the glass transparence substrates 2 and 5 from the ITO film etc. and are obtained by covering the orientation control film 4 and 7 which becomes the front face of these transparent electrodes 3 and 6 and the transparence substrates 2 and 5 from the polyminds film etc. Orientation control processing is performed to the above-mentioned orientation control format by a be above-mentioned charge of spacer 9 material, organic or an inorganic material is used. As a spacer of an inorganic material, the thing containing an aluminum oxide, a silicon dioxide, atc. is mentioned (for example, reference, such as JP.63-73225A and JP.1-599974A). However, since the orientation film was damaged since the degree of hardways is high, or the thickness change by thermal expansion and contraction was not able to follow in footsteps of a substrate easily, the spacer of the conventional inorganic material caused poor app unevenness.

gap unevenness.
[0005] Moreover, the spacer of an organic material has the moderate degree of hard does not damage the orientation film, tends to follow in footsteps of change of the thickness by thermal expansion or the heat shrink, and has the descriptions, like there is still less spacer thermal expansion or the heat shrink, and has the descriptions, like there is still less spacer migration within a cel, and the polymer of a polystyrene system or a benzoguaranine system is mainly used (for example, reference, such as JP.80-200228.A and JP.1-293318.A). [2006] However, the liquid crystal display produced using the above-mentioned spacer had the problem that the abnormality orientation of fiquid crystal occurred in the circumference of a liquid crystal spacer, immediately after production of a cell (henceforth a "initial state"), and after high-voltage impression. In the display which used especially super-twisted-mentic (STN) liquid crystal, the inclination became remarkable and there was a trouble that a homogeneous image could not be held. The cause of this abnormality orientation is for a liquid crystal molecule to carry out crientation to the circumference of a spacer, and the size of this abnormality orientation is further presumed to be a thing depending on extent of the orientation of a liquid crystal molecule.

orientation is intrinsi presumed to be a timing departuring on extent or the orientation or a inqui-crystal molecule.

[0007] In order to solve such abnormality orientation, the dielectric constant (refer to JP,6-67182,A) of a spacer and examination which changes a spacer surface presentation (refer to

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

JP.11-223821.A [DETAILED DESCRIPTION]

3/32 ページ

front face, making said particle front face generate a radical, and making the polymerization nature monomer which has a long-chain slkyl group with this radical as the starting point react. [0017] The spacer for liquid crystal display components according to claim 6 (henceforth "this invention 5") By making an oxidizing agent react to the particle which has a reducibility radical on a front face, making said particle front face generate a radical, and making the polymerization nature monomer which has a functional group with this radical as the starting point react it is the spacer for liquid crystal display components which is made to form in said particle front fact the graft polymerization layer which has a functional group, and is further characterized by making a long-chain alkyl compound come to react to the graft polymerization layer which has said functional group.

[0018] The spacer for liquid crystal display components according to claim 7 (henceforth "this

making a long—thain alkyl compound come to react to the graft polymerization layer which has asid functional group.

[0018] The spacer for liquid crystal display components according to claim 7 (henceforth "this invention 6") By making an oxidizing agent react to the particle which has a reducibility radical on a front face, making said particle front face generate a radical, and making the polymerization nature monomer which has a functional group with this radical as the starting point react. The graft polymerization layer which has a functional group is made to form in said particle front face. Further By making the polymerization nature monomer which has an epoxy group react to it. efter introducing the active group which has a polymerization nature will group and/or polymerization initiation ability into the graft polymerization layer which has and functional group. It is the spacer for flouid crystal display components characterized by making it come to form the graft polymerization layer which has an epoxy group in the graft polymerization layer front face which has all functional group with the particle which has a reducibility radical on a front face, making said particle front face generate a radical, and making the polymerization nature monomer which has a functional group with this radical as the starting point react. The graft polymerization layer which has a functional group with this radical as the starting point react. The graft polymerization institute ability into the graft polymerization nature winyl group and/or polymerization indication ability into the graft polymerization nature winyl group and/or polymerization indication ability into the graft polymerization nature winyl group and/or polymerization indication ability into the graft polymerization nature winyl group and/or polymerization indication ability into the graft polymerization nature winyl group and/or polymerization serve which has a long-chain ably group in the graft polymerization of proup.

Tonno A Ende and A directional

front face which has said functional group.

[10020] A liquid crystal display component thenceforth "this invention 8") according to claim 9 a liquid crystal display component characterized by for two glass substrates with which the orientation film and a transparent electrode have been arranged countering through the spacer

for liquid crystal display components according to claim 1, 2, 3, 4, 5, 6, 7, or 8, and enclosing liquid crystal between said glass substrates. (0021) The spacer for liquid crystal display components of this invention 1 makes it come to form the shell layer which consists of a polymerization nature monomer in the front face of the

form the shell layer which consists of a polymerization nature monomer in the front face of the particle which is the so-called core shell type of spacer, and is a core. [0022] Since the particle used in this invention 1 functions as a core particle of the spacer for fiquid crystal display components, verious engine performance is required in particle size, particle size distribution, dynamics reinforcement, etc. [0023] The particle size of the above-mentioned particle has desirable 1-10 micrometers. The particle size distribution of the above-mentioned particle is the CV value which brothe standard deviation by particle size, and is desirable. [10% or less of] As for the dynamics reinforcement of the above-mentioned particle, it is desirable that 10% it value is 250-1000. Since the reinforcement of a particle was not enough, in case a liquid crystal display component was constructed as it is less than 250, when a spacer is destroyed, and a suitable gap does not come out, but 1000 was exceeded and it includes in a fixual crystal display component, the orientation film on a substrate is damaged and the abnormalities in a display occur. [0024] in addition, above-mentioned 10% it value — the Patent Publication Heiseis No. 503180 [six to] official report — being based — a minute compression test machine (PCT-200, Shimadzu Corp. make) — using — the smooth end face of a cylinder with a diameter [made

JP.8-118421.A) are performed. However, in order to prevent abnormality orientation, after changing the presentation of a polymer a lot, it became a brittle particle whout reinforce required for a spacer, and there was a problem destroyed in case a flouid crystal display nt is constructed

component is constructed.

[0008] Moreover, migration of a spacer took place by vibration at the time of impregnation of figuid crystal and the conveyance after production etc., and the liquid crystal display produced using the conventional spacer had the problem from which this migration part serves as display nonuniformity. Especially, by the spread of television for mount, navigation systems, etc., since the use opportunity of the liquid crystal display in the intense location of vibration is increasing, recent years require the adhesion high spacer more.

[0009] having also covered adhesion layers which have the adhesion over a substrate on a particle front face, such as synthetic resin of a low-most point, and a wax, to such a demand — although — it is proposed (refer to 19.83–94224.A). However, such a spacer had the problem of an adhesion haver having enfoliated [tend] from a particle front face, and the adhesion bayer which exfoliated having mixed in liquid crystal, and reducing the display engine performance of a liquid crystal display.

performance of a bigad crystal display.

[0010] Then, the sprealled core shell type which considers only a particle front face as the presentation suitable for abnormality orientation prevention and the presentation excellent is adhesion of spacer is examined with reinforcement with the sufficient interior of a particle. However, the whole front face could not be embellished in homogeneity, and the problem of actuation of a complicated multistage story being required was left behind to making a shell better. (0011)

[Problem(a) to be Solved by the Invention] This invention aims at offering the spacer for liquid crystal display components of the core shell type which gave functionality, such as abnormality orientation prevention engine performence and adhesive ability, to the shell layer, and the liquid crystal display component using it, holding the dynamics reinforcement needed for a spacer in rw of the above [0012]

[0012] Means for Solving the Problem] The spacer for liquid crystal display components according to claim I (henceforth "this invention I") is a spacer for liquid crystal display components which makes an oxidizing agent react to the particle which has a reducibility radical on a front face, makes the abover-mentioned particle front face generate a radical, and makes it come with this radical as the starting point to form a polymerization layer in the abover-mentioned particle front.

face. [0013] The spacer for liquid crystal display components according to claim 2 is a spacer for liquid crystal display components according to claim 1 whose oxidizer is a cerium salt. [0014] The spacer for liquid crystal display components according to claim 3 (henceforth "this invention 2") is a spacer for liquid crystal display components characterized by making it come to form a reactant graft polymerization layer in said particle front face by making an oxidizing agent react to the particle which has a reducibility radical on a front face, making said particle

agent react to the particle which has a reducibity radical on a front face, making said particle front face generate a radical, and making the polymerization nature monomer which has an epoxy group with this radical as the starting point react. [0015] The spacer for liquid crystal display components according to claim 4 (henceforth "this invention 3") Make an oxidizing agent react to the particle which has a reducibility radical on a front face, make said particle front face generate a radical to it, and it starts from this radical to it. By making the polymerization nature monomer which has the polymerization rature monomer and ethylene glycol radical which have an epoxy group react, it is the spacer for liquid crystal display components characterized by making it come to form a reactant graft polymerization haver in said particle front face. layer in said perticle front face.

(016) The spacer for Rouid crystal display components according to claim 5 (henceforth "the invertion 4") is a spacer for Rouid crystal display components characterized by making it conform in said particle front face the graft polymerization layer which has a long-chain alkyl group by making an oxidizing agent react to the particle which has a reducibility radical on a

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

JP.11-223821.A [DETAILED DESCRIPTION]

4/32 ページ

from a diamond] of 50 micrometers — it is — the above-mentioned particle — the compression degree of hardness of 0.27g/second, and the maximum trial — too heavy — it is the value which compresses by 10g and is calculated from the following formula.

[0025] R-1[K= (3/root2) and F-S-3/2 and]/2F: The too heavy value in 10% compression set of

the compression in 10% compression set of a particle — a variation rate (mm). The radius of a particle (mm)

R: The radius of a particle (mm)
[0026] In this invention 1, the above-mentioned particle has a reducibility radical on a front face. to the control of the control of the special particle of the control of the contr especially as an approach of obtaining the particle which has the above-mentioned reducibiting radical on a front face, for example, according to polymerization methods, such as an emulsion polymerization, a suspension polymerization, a seed polymerization, a distributed polymerization the approach using a surfactant etc. is mentioned. Moreover, the non-subtlety particle which has the above-mentioned reducibility radical on a front face may be used.

(0028) As an approach by the describing (above) polymerization method, copolymerization of a reducibility radical content monomer, and the above—mentioned reducibility radical content monomer, the monomer of copolymerizable others and/or the above—mentioned reducibility radical content monomer and a copolymerizable cross—linking monomer is carried out, for example, and a particle is obtained.

example, and a particle is obtained.
[0029] it is not fimited especially as a reducibility radical of the abover-mentioned reducibility
radical content monomer, for example, a hydroxyl group, a thiol group, an aldehyde group, a
sufflydryl group, the amine group, etc. are mentioned, it is not limited especially as the abovermentioned reducibility radical content monomer, for example, acrylic seter (meta) derivative;
styrene derivative; vinyl ester; conjugated dienes, such as hydroxyethyl (meta) acrylate,
hydroxypropyl (meta) acrylate, hydroxy butyl (meta) acrylate, 2-methacryloikoxy-ethyl succinic
scid, a 2-methacryloyloxy phthatic acid, monochrome [2 (meta) acrylyolxyethyl) acid phosphate,
glycerol monochrome (meta) acrylate, and GURISERINJI (meta) acrylate, are mentioned.
[00301] if it is not brinted especially as the abover-mentioned reducibility radical content monomer gycerol monochrome (meta) acrystate, and GUNIS-HINJI (meta) acrystate, are mentioned.
[0030] if it is not limited especially as the above-mentioned reducibility radical content monomer and a monomer of copolymerizable others but the particle of a macromolecule is obtained for example, styrene, slipha methyl styrene, pre-methyl styrene, p-chloro styrene, Styrene derivatives, such as chloro methyl styrene; A vinyl chloride, vinyl acetate, vinyl ester [, such as propionic-acid vinyl,];— unsaturated nitrile [, such as asylonitrile]; (meta) — a methyl acrystate — An ethyl scrystate, butyl acrystate (meta). (Meta) Acrysic ester (meta) derivatives, such as trifluoroethyl (meta) acrystate, perturbinor propyl (meta) acrystate (meta). (Meta) Acrysic-caid stearyl, ethylene glycol (meta) acrystate, perturbinor propyl (meta) acrystate, and cyclohexyl (meta) acrystate; conjugated dienes, such as a butadiene and an isoprene, are mentioned.
[0031] It is not limited especially as the abover-mentioned reducibility radical content monomer and a copolymerizable cross-linking monomer, for example, a divrystenzene, polyethylene GURIXORIU.I (meta) acrystat, 1, 8-hexane diDRIU.II (meta) acrystate, neopentyl GURIXORIU.II (meta) acrystate, objectively acrystate, disilyl phthalate and its isomer, trialbyl isocyanurate, its derivative, etc. are mentioned.
[0032] Moreover, it has a reacting point in the side chain of radical polymerization nature monomers, such as gamma-methacryloxycopyl trimethoxy slane, a particle may be made, and what game sufficient dynamic reinforcement by the crosslinking reaction of a side-chain part may be used. [0030] If it is not limited especially as the above-mentioned reducibility radical content m

to used. (0003) The above-mentioned reducibility radical content monomer, the above and other monomers, and the above-mentioned cross-linking monomer may be used independently, and may use two or more sorts together. However, it is desirable to make the above-mentioned cross-linking monomer into 30% or more in [all] a monomer from a viewpoint of the reinforcement of the spacer for liquid crystal display components obtained.

[0034] It is not limited especially as a polymerization initiator used in case copolymerization of the above-mentioned reducibility radical content monomer, and the above and other monomers and/or the above-mentioned cross-linking monomers is carried out. For example, a bentoyl peroxide, lauroyl peroxide, an orthochromatic chloro benzoyl peroxide, An orthochromatic methoxy benzoyl peroxide, 3 and 5, 5-trimethyflusanoyl peroxide, Organic peroxide, such as t-butyberoxyl-zethyfluxanoste and G (-buty) peroxide; aze system compounds, such as azobissobutyronitril, azobis cyclohexa carbonitrile, and azobis (2,4-dimethyfvaloronitrile), etc. are arobisisobutyronitril, arobis cyclohera carbonitrile, and arobis (2.4-dimethylvaleronitrile), etc. are mentioned. The amount of the above-mentioned polymerization initiator used usually has desirable 0.1 - 10 weight section to a total of 100 weight sections of a monomer. (0035) The above-mentioned reducibility radical content monomer, the above and other monomers, the above mentioned cross-finking monomer, and the above-mentioned polymerization initiator may also teach the whole quantity first, and after they teach a part, they may supply the remainder probably or continuously, in order to prevent the polymerization control by orygen on the occasion of a polymerization, inert gas, such as nitrogen, may permute the system of reaction, and it may be performed. Moreover, on the occasion of a polymerization, a distributed stabilizer can also be used if needed. As the above-mentioned distributed stabilizer can also be used if needed. As the above-mentioned distributed stabilizer. the surfactant of a meltable macre

a medium.

[0038] As an approach using the above-mentioned macromolecule protective agent, the approach of introducing a reducibility radical into the front face of the particle obtained etc. is mentioned, for example by using the macromolecule protective agent which has a reducibility radical, in case the polymerization of the particle is carried out. As the above-mentioned macromolecule protective agent, especially if a reducibility radical is contained, it will not be limited, for example, water soluble polymers, such as polyvinyl alcohol, a polyvinyl alcohol derivative, a cellulous, cellulous a cettat, starch, methyl cellulous, a carboxymethyl cellulous, hydroxyethyl cellulous, and the Pori (meta) acrylic acid (sodium salt), etc. are mentioned, hydroxyethyl cellulous, and the Pori (meta) acrylic acid (sodium salt), etc. are mentioned, control to the protective surface of the particle obtained etc. is mentioned, for example by using the reactive surface active agent which has a reducibility radical, in case the polymerization of the particle is carried out. You may be macromolecule particles, such as not only the particle that is made to carry out the polymerization of the above mentioned reducibility radical content monomers, and is obtained as a particle which has the above-mentioned reducibility radical on a front face but benzoguanamino, nylon, polyester, protein, etc., and the particle which content monomers, and is obtained as a particle which has the above-mentioned reducibility radical on a front face but betwogsparanine, refox, polyster, protein, etc., and the particle which consists of an inorganic compound which has a reducibility redical on a front face. [0038] The above-mentioned particle may be a coloring particle colored for the improvement in contrast of a liquid crystal display component. What was not limited especially as the above-mentioned coloring particle, for example, processed the above-mentioned particle with carbon black, a disperse dye, acid by, basic dye, a metallic oxide, etc.; the film of the organic substance is made to form in the front face of the above-mentioned particle, and what was colored by making it decompose or carbonics at an elevated temperature is mentioned. Moreover, when the quality of the material itself which forms the above-mentioned particle has the color, it can use

quarry of the material fiself which forms the above-mentioned particle has the color, it can a as the above-mentioned coloring particle as it is, without coloring. [0039] The method of carrying out the suspension polymerization of the constituent obtained not being limited especially as the manufacture approach of the above-mentioned coloring particle, for example, making the above-mentioned reducibility radical content monomer etc. distribute a signment in an aquosity medium to the bottom of existence of the above-mention polymerization initiator etc. is mentioned.

polymerization initiator etc. is mentioned.
[040] it is not limited expecially as a pigment used in case the above-mentioned coloring particle is manufactured. For example, inorganic color pigments, such as carbon black, a graphite, iron black, chrome green, cobat green, and chromic oxide: Brilliant carmine BS Lake carmine FB, brilliant fast scarlet, Lake Red 4R, Permanent Red R, the farce tread FGR, a tolaidine chestrut, Bis-azo yellow, the first yellow Q, a bis-azo orange, Balkan Peninsula Orange. Azo systems and condensation azo system organic color pigments, such as pyrazolone red A copper phthalocyanine blue, farce toss — a turnip — color take organic color pigment; kino FUTARON

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

2007/02/02

JP.11-223821.A [DETAILED DESCRIPTION]

7/32 ページ

Moreover, in addition to the above-mentioned hydroxyl group, epoxy groups, such as glycidyl (meta) acrylate, the monomer which has a carboxylic-acid radical etc. further are mentioned give reactivity to the shell layer of the spacer for liquid crystal display components obtained. These may be used independently and may use two or more sorts together. Moreover, these rization nature monomer and other copolymerizable polymerization nature mo

be used together.

(0043) As an approach of making a polymerization layer forming in the above-mentioned particl front face, the particle which has the above-mentioned reducibility radical on a front face distributes in a solvent, for example, the above-mentioned polymerization nature monomer and

front face, the particle which has the above-mentioned reducibility radical on a front face distributes in a solvent, for example, the above-mentioned polymerization nature monomer and the above-mentioned cerium salt add to this, and the approach of carrying out a polymerization reaction etc. is mentioned to it by making the particle which has the above-mentioned reducibility radical on a front face using the above-mentioned cerium salt generate a radical, and making the above-mentioned polymerization nesture monomer react further. [0050] Although especially the reaction temperature under above-mentioned polymerization reaction is not limited, the stability of the complex of the above-mentioned polymerization reaction is not limited, the stability of the complex of the above-mentioned cerium salt to 0-90 degrees C are desirable. It is 10-50 degrees C more preferably. Especially although not limited especially as a class of the above-mentioned solvent, since the above-mentioned cerium salt reacts with the alcohol which is a solvent and the reactivity changes especially with classes (1 and 2-glycol > the class [1st] > the class [2nd] > the 3rd class) of alcohol in using alcohol, it is suitable to use tertiary alcohol, such as t-butyl alcohol. [0051] in order [moreover.] to speed up the reaction rate of the polymerization system of reaction when a graft polymerization reaction cannot occur easily only with the above-mentioned cerium salt for -- being slike — an acid suitable in a polymerization system can be added and it can react in an acid range. It is not limited especially as the above-mentioned acid, for example, a ritric acid, a suffuric acid, a hydrochloric acid (formic acid, etc. are mentioned t. it is more suitable for six or less plt to because disordies still lower as an acid range of the polymerization system of reaction. This is because dissociation of the above-mentioned cerium salt stops being alobe to happen easily, when pH is high.

system of reaction. This is because dissociation of the above-mentioned cerum salt stops being able to happen easily, when pH is high. [0052] Moreover, further various reactions can be performed to the reaction possible part on the particle in which the polymerization layer obtained as mentioned above was formed. Although not limited especially as what is used for such a reaction, a compound with an isocyanate radical, the amine group, a carboxylic-scid radical, a carboxylate ghost, an epoxy group, a hydroxyl group, etc. can be used, for example.

[0053] This invention 2 is a spacer for liquid crystal display components which makes it come to from a neartest such lost for example.

[U03] This invention 2 is a spacer for inquio crystan display components when misses is come to form a reactivity graft polymerization layer in the above-mentioned particle front face by making an oxidizing agent react to the particle which has a reducibility radical on a front face, making the above-mentioned particle front face generate a radical, and making the polymerization nature monomer which has an epoxy group with this radical as the starting point react. [0054] The particle which has the reducibility radical used in this invention 2 on a front face is the same as that of the particle which has the reducibility radical explained in full detail in materials of this invention. I on a foort face.

the same as that of the particle which has the reducibility radical explained in full detail in explanation of this invention I on a front face. (0055) it is the same as that of the oxidizor explained in full detail in explanation of this invention 1 as an oxidizor used in this invention 2. (0056) The acrystate which is not firsted especially as a polymerization nature monomer which has the epoxy group used in this invention 2, for example, contains glycidyl (meta) acrystate, the glycidyl allyl compound ether, and alicyclic epoxy (meta) is mentioned. These may be used independently and may use two or more sorts together. (0057) Moreover, in addition to the polymerization nature monomer which has the above-mentioned epoxy group, copolymerization of the polymerization sature monomer which has the above-mentioned epoxy group, and the monomer of copolymerization which has the above-mentioned epoxy group, and the monomer of copolymerization sture may be carried out. It is not limited especially as the above and other monomers. For example, styrene, alpha methyl styrene, Syrene derivatives, such as propionic-acid vinyl, 1;— unsaturated nitrile [.such as scrytonitine]. [.meta). — a methyl acrystate — An ethyl acrystate. buttyl acrystate (meta), 2. styrene; Virgine survived ster [, such as propionic-acid vinyl,]; — unsaturated natrile [, es scrylonitrile]; (meta) — a methyl scrylate — An ethyl scrylate, butyl scrylate (meta), 2system organic color pigments, such as the phthalocyanine system organic color pigment; slake [, such as a roux and Phthalocyanine Green,]t, Lowe's lake, Molet-Lake, blue lake, and Green lake, etc. are mentioned. These may be used independently and may use two or mor

sorts together. [0041] The addition of the abo sorts together.

[0041] The addition of the above-mentioned pigment has the desirable 1 - 180 weight section to a total of 100 weight sections of the monomer used for manufacture of the above-mentioned coloring particle. If it is hard coming to color it a dark color in case of under 1 weight section and the 180 weight sections are exceeded, the mechanical strength of the particle obtained may not be obtained. It is the 3 - 180 weight section more preferably.

[0042] The approach which is not finited to the above-mentioned reducibility redical content monomer due, executing as a manufacture of making homespecies we destributions the above-

monomer sto. expecially as an approach of making homogeneity distributing the above— mentioned pigment, for example, uses a bell mill, a bead mill, a sand mill, attritor, a Sand grinder, a neno mizer, etc. is mentioned. [0043] In case the above-mentioned reducibility radical content monomer etc. is made to

a neno mizer, stc. is mentioned.

[0043] In case the abover-mentioned reducibility radical content monomer etc. is made to distribute the abover-mentioned pigment, a dispersant may be added in order to raise the dispersibility of the abover-mentioned pigment, it is not limited especially as the abover-mentioned pigment, it is not limited especially as the abover-mentioned dispersant, for example, water soluble polymer; barium suffates, such as polyminy slochol, starch, methyl cellulose, a carboxymethyl cellulose, hydroxyethyl cellulose, and polymethacrytic acid sodium, a calcium suffate, an aluminum suffate, a calcium carbonate, cal polymeroscrypto acid sodurn, a calcum sumate, an aummun surate, a cincum carbonate, calcum phosphate, tak, clay, the distorn earth, metallis-oxido powder, etc. are mentioned. The addition of the above-mentioned dispersant has desirable 0.01 - 20 weight section to a total of 100 weight sections of the monomer used for manufacture of the above-mentioned cotoring particle. [0044] A polymerization layer is made to form in the above-mentioned particle front face in this invention 1 by making an oxidizing agent react to the particle which has the above-mentioned reducibility social on a front face, making the above-mentioned particle front face generate a radical, and making a polymerization nature monomer react with this radical as the starting point

[0045] It is possible to oxidize the particle front face which has the above-monitioned reducibility radical on a front face as the above-mentioned oxidizing agent, and to make a radical generate, especially that is not limited, for example, persulfate, a cerium salt, a hydrogen persulfate intenthylamilies, sodium persulfate, potassim permangerate, alley born, etc. are mentioned. Moreover, in order to speed up the reaction rate of a polymerization system, acids and salts, such as a nitric acid may be added.

such as a nitric acid, may be added.

[0048] 0.0001-20-moR of the concentration of the abover-mentioned oxidizer is desirable to the whole quantity of the monomer used for manufacture of the abover-mentioned particle. If the incidence rate of the radical which becomes being less than [0.0001 mol %] with a graft polymerization start point on a particle falls and 20-mol % is exceeded, a superfluous oxidizing agent will react with the radical which carried out end generating, will make a start point disappear, and will lesson a polymerization start point.

[0047] In this invention 1, a cerium salt is suitably used as the abover-mentioned oxidizer. As the abover-mentioned cerium salt, especially if it is tutravalence, it will not be limited, for example, continued to whate a present pairset cerium (4) suither ammonium, prophosphoric-good cerium.

above-mentioned cerium salt, especially if it is tatravalence, it will not be limited, for example, cerium (4) suffate, a cerium intrate, cerium (4) suffate, as cerium intrate, cerium (5) suffate ammonium, propriopsophoric-acid cerium ammonium, an iodation cerium, etc. will be mentioned (0048) What is necessary is not to be limited but just to use what has the engine performance to give the spacer for fiquid crystal display components obtained especially, as the above-mentioned polymerization nature monomer, if it is a radical polymerization nature monomer. For example, the monomer which has hydroxyl-group; ethylene-glycol components, such as hydroxyletyl (meta) acrystate and methoxy polyethylene-glycol (meta) acrystate, is mentioned to give a hydrophilio property to the spacer for liquid crystal display components obtained. Moreover, the glycidyl (meta) acrystate which has styrene derivative; reactive sites, such as fluorine contant (meta) acrystate; styrene, such as alkyl (meta) acrystate; such as crystate, such as butyl acrystate (meta) acrystate, and problero styrene, an acrysic-acid (meta) stearyl, and pentafluoro propyl (meta) acrystate, and problero styrene, an acrysic-acid (meta), acrystanide (meta), etc. can be mentioned to give hydrophobicity to the spacer for liquid crystal display components obtained.

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

2007/02/02

JP,11-223821,A [DETAILED DESCRIPTION]

8/32 ページ

ethylhexyl acrylate (meta). (Meta) Ethylene glycol (meta) acrylate, trifluoroethyl (meta) acrylate, Cyclohexyl (meta) acrylate, hydroxyethyl (meta) acrylate, Acrylic ester (meta) derivatives, such as hydroxypropyl (meta) acrylate, hydroxy butyl (meta) acrylate, glycerol monochrome (meta) acrylate, and GURISERINLI (meta) acrylate, etc. are mentioned. These may be used

acrylate, and GURISERINAII (meta) acrylate, etc. are mentioned. These may be used independently and may use two or more sorts together. [0058] Although it is not limited especially as reaction temperature of graft polymerization reaction time in case the above-mentioned reactant graft polymerization layer is made to form, the viewpoint of the viacosity of reaction time or a system to 30-100 degrees C are desirable. [0059] Moreover, although not limited especially as a solvent of graft polymerization reaction time, the mixed stock of the water independent from a soluble viewpoint of the above-mentioned oxidizer or water, and a polar organic solvent for example, other, dimethyl sufficials [I such as ketones methyl ether, I, such as alcohols; sectores, such as a methanol, ethenol, propanol, in propanol, a butanol, and t-butyl alcohol, and a methyl ethyl ketone, dimethyl formamide, etc. are mentioned. These may be used independently and may use two or more sorts together.

butanol, and tr-butyl alcohol, and a methyl ethyl ketone, dimethylformamide, etc. are mentioned. These may be used independently and may use two or more sorts together. [0060] A graft polymerization layer does not exfoliate from a particle front face, and the spacer for liquid crystal display components of this invention 2 has the high adhesion over a substrate. Therefore, liquid crystal is not polluted and the liquid crystal display component which comes to use the spacer for liquid crystal display components of this invention 2 does not have generating of the display noruniformity by migration of a spacer style. [0061] This invention 3 is a spacer for liquid crystal display components characterized by making it come to form a reactant graft polymerization layer in said particle front face by making an oxidizing agent react to the particle which has a reducibility radical on a front face, making said existing force face excerted, a radical making the notween center nature moreoner which her and the face excerted as radical means the component of the nature moreoner which her making the notween component and the component of the saturation species for the component of the component which her making the notween component of the component of the saturation and the saturation of the component of the c

front face generate a radical, and making the polymerization nature monomer which has merization nature monomer and ethylene glycol radical which have an epoxy group with

the polymerization nature monomer and strylene gycoi radical which nave an epoxy group with this radical as the starting point react. [0082] The particle which has the reducibility radical used in this invention 3 on a front face is the same as that of the particle which has the reducibility radical explained in full detail in explanation of this invention 1 on a front face. The oxidizer used in this invention 3 is the same as the oxidizer explained in full detail in explanation of this invention 1. [0083] The polymerization nature monomer which has the epoxy group used in this invention 3 is the same as the polymerization nature monomer which has the epoxy group explained in full detail in explanation of this invention 2. As for the polymerization nature monomer which has the ethylene glycol radical used in this invention 3, polyethylene glycol monomethacrystat, methoxy polyethylene shorted monomethacrystate, methoxy

ethylene glycol radical used in this invention 3, polyethylene glycol monomentuscrystic, metric polyethylene glycol polypropylene glycol monomethacytate, polyethylene-glycol polypropylene glycol monomethacytate, polyethylene-glycol polytorylene glycol monomethacytate, polyethylene-glycol polypropylene-glycol monomethacytate, etc. are mentior. These may be used independently and may use two or more sorts together. [0064] Moreover, in addition to the polymerization nature monomer which has the polymerization rature monomer and ethylene glycol radical which have the above-mentioned epoxy, copolymerization of the polymerization nature monomer which has the polymerization nature. organization of the polymerization nature monomer which has the polymerization nature nomer and ethiques glycol redical which have the above-mentioned epoxy, and the monon copolymerizable others may be carried out. What was illustrated as the polymerization nat nomer which is not limited especially as the above and other monomers, for example, has my in explanation of this invention 2, and a monomer of copolymerizable others, the same

tring, etc. are merizoned. [0055] Although it is not limited especially as reaction temperature of graft polymerization reaction time in case the above-mentioned reacturit graft polymerization layer is made to form the viewpoint of the viscosity of reaction time or a system to 30–100 degrees C are desirable. [0068] Moreover, although not limited especially as a solvent of graft polymerization reaction time, the mixed stock of the water independent from a soluble viewpoint of the above-mentione oxidizer or water, and a polar organic solvent is desirable. The same thing as the polar organic solvent which it was not limited especially as the above-mentioned polar organic solvent, for example, was illustrated in explanation of this invention 2 etc. mentions, and it is ****

[0081] A graft polymerization layer does not exfoliate from a particle front face, and the spacer for liquid crystal display components of this invention 3 has the high adhesion over a substrate. Therefore, liquid crystal is not polluted and the liquid crystal display component which comes to use the spacer for liquid crystal display components of this invention 3 does not have generating of the display nonuniformity by migration of a spacer etc. [0088] This invention 4 is a spacer for liquid crystal display components which makes it come to form in the above-mentioned particle front face the graft polymerization layer which has a long-chain altryl group by making an oxidizing agent react to the perticle which has a reducibility radical on a front face, making the above-mentioned particle front face generate a radical, and making the polymerization nature monomer which has a long-chain alkyl group with this radical as she starting point react.

as the starting point react. [0089] The particle which has the reducibility radical used in this invention 4 on a front face is

[0083] The particle which has the reducibility radical used in this invention 4 on a front face is the same as that of the particle which has the roducibility radical explained in full detail in explanation of this invention 1 on a front face. The oxidizer used in this invention 4 is the same as the oxidizer explained in full detail in explanation of this invention 1. [0070] Although not limited especially as a polymerization nature monomer which has the tong-chain alityl group used in this invention 4, since it excels in the effectiveness of abnormality orientation prevention, a with a carbon numbers of six or more thing is desirable. It is not limited especially as a polymerization nature monomer which has such a long-chain alityl group. For example, henyl (meta) acrylate, octyl (meta) acrylate, 2-ethylhenyl (meta) acrylate, tought independently and may use two or more sorts together.
[0071] Moreover, in addition to the polymerization nature monomer which has the

[0071] Moreover, in addition to the polymerization nature monomer which has the above-mentioned long-chain alkyl group, oppolymerization of the polymerization nature monomer whi has the above-mentioned long-chain alkyl group, and the monomer of copolymerizable others may be carried out. What was illustrated as the polymerization nature monomer which is not invited especially as the above and other monomers, for example, has epony in explanation of this invention 2, and a monomer of copolymerizable others, the same thing, otc. are mentioned [0072] Although it is not limited especially as reaction temperature of graft polymerization reaction time in case the graft polymerization layer which has the above-mentioned long-chain alkyl group is made to form, the viewpoint of the viscosity of reaction time or a system to 30-100 degrees C are desirable.
(0073) moreover, although not limited especially as a solvent of graft polymerization react

(M/J) moreover, strough not antice especially as a soverer to graft polymeration reaction time, as a norpolar solvent, from a soluble viewpoint of a polymerization nature monomer of having the above-mentioned long-chain sityl group A hexane, a heptane, an octarie, bengene, tokerer, etc. for example, as a polar solvent for example, water, a methanol, ethanol, propanol, i-propanol. Ether [, such as ketones; methyl ethyl ketone; dimethyl salfoxide, dimethyl solvent for example, water, a methyl ethyl ketone; dimethyl sulfoxide, dimethyl solfoxide, dimethyl formanide, etc. are mentioned. These may be used independently and may use or more sorts together.

two or more sorts together.

(D074) This invention 5 is a spacer for liquid crystal display components which makes the graft-polymerization layer which has a functional group form in the above-mentioned particle front face, and makes a long-chain alkyl compound come further to reset to the graft-polymerization layer which has the above-mentioned functional group by making an oxidizing agent reset to the particle which has a reducibility radical on a front face, making the above-mentioned particle front face generate a radical, and making the ophymerization nature monomer which has a functional group with this radical as the starting point reset.

[0075] The particle which has the reducibility radical used in this invention 5 on a front face is the same as that of the particle which has the reducibility radical application of in 16 starting and in this invention 5 on a front face is

the same as that of the particle which has the reducibility radical explained in full detail in resplanation of this invention 1 on a front face. The oxidizer used in this invention 5 is the same as the oxidizer explained in full detail in explanation of this invention 1.

[0076] The polymerization nature monomer which is not limited especially as a polymerization

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

2007/02/02

9/12 ページ

JP.11-223821,A [DETAILED DESCRIPTION]

11/32 ページ

explanation of this invention 1 on a front face. The oxidizer used in this invention 6 is the same as the oxidizer explained in full detail in explanation of this invention 1. (0083] The graft polymerization layer which has a functional group in this invention 6 is the same as the graft polymerization layer which has the functional group explained in full detail in

ation of this invention 5.

as the graft polymerization layer which has the functional group explained in full detail in explanation of this invention 5.

[0084] In this invention 6, the active group which has a polymerization insture viring group and/or polymerization initiation shiftly is introduced into the graft polymerization layer which has the above-mentioned functional group. The method of making the compound which has the functional group in which a reaction is possible, and a polymerization nature viring group to the functional group of the graft polymerization layer which has the above-mentioned functional group react to the graft polymerization layer which has the above-mentioned functional group react to the graft polymerization layer which has the above-mentioned functional group react to the graft polymerization layer which has the above-mentioned functional group etc. is mentioned. It is not limited especially as such a compound, for example, acrylory (meta) any explain isocyanate, an acrylic acid (meta), acrylor-acid (meta) chloride, acrylamide (meta), glycidyl (meta) acrylate, etc. are mentioned functional group in which a reaction is possible to the functional group of the graft polymerization layer which has the above-mentioned functional group, for example as an approach of introducing the active group which has polymerization initiation shifty into the graft polymerization layer which has the above-mentioned functional group as a compound, etc. react to the graft polymerization layer which has the above-mentioned functional group as a compound, etc. react to the graft polymerization layer which has the above-mentioned functional group as a compound, etc. acct to the graft polymerization layer which has the above-mentioned functional group as a compound, etc. acct to the graft polymerization layer which has the above-mentioned functional group as a compound, etc. acct to the graft polymerization layer which has the above-mentioned functional group as an approach of introducing the acct is mentioned.

compound, for example, a ** and ** access to propose the control of the control o

[0088] Moreover, in addition to the polymerization nature monomer which has the al and epoxy group, copolymerization of the polymerization nature monomer which has mentioned epoxy group, and the monomer of copolymerizable others may be carri-

above mentioned epoxy group, and the monomer or copolymerazable others may be carried out. What was illustrated as the polymerization nature monomer which is not limited especially as the above and other monomers, for example, has an epoxy group in explanation of this invention 2, and a monomer of copolymerizable others, the same thing, etc. are mentioned. [0089] A graft polymerization layer does not exfoliate from a particle front face, and the spacer for liquid crystal display components of this invention 6 has the high adhesion over a substrate. Therefore, liquid crystal in not polluted and the liquid crystal display component which comes to use the spacer for liquid crystal display components of this invention 6 does not have generating

use the spacer for fiquid crystal display components of this invention 6 does not have generating of the display nonuniformity by migration of a spacer etc. [1090] This invention 7 by making an oxidizing agent react to the particle which has a reducibility radical on a front face, making the above-mentioned particle front face generate a radical, and making the polymerization nature monomer which has a functional group is made to form in the above-mentioned particle front face. Further By making the polymerization nature monomer which has a functional group is made to form in the above-mentioned particle front face. Further By making the polymerization nature monomer which has a long-chain advergoup react to it, after introducing the active group which has a polymerization nature vinyl group and/or polymerization initiation ability into the graft polymerization layer which has the above-mentioned functional group it is the spacer for liquid crystal display components characterized by making it come to form the graft polymerization layer which has a long-chain alkyl group in the graft polymerization layer front face which has the reducibility radical used in this invention 7 on a front face is

nature monomer which has the functional group used in this invention 5, for example, has functional groups, such as a carboxyl group, a hydroxyl group, the amino group, an amide group, an epony group, a suffone radical, a sufflydryl group, and an isocyrante radical; the viryl monomer which generates the above functional groups with means, such as hydrolysis, addition, condensation, and ring breakage, is mentioned, it is not finited especially as such a monomer. For example, an scryicia exid (metal), 2-(meta) acryloylosysthyl succinic exid, 2-(meta) acryloylosysthyl ghithatia exid, 2-hydroxysthyl (metal) acrylosythyl ghithatia exid, 2-hydroxysthyl (metal) acrylate, 2-hydroxypropyl (metal) acrylate, A glycerol (meta) acrylate, 8-hydroxypropyl menthoxy stane, p-suffonic-acid styrene, 2-facryloylosimon)—An isobutane suffonic scid, scryloyl (metal) acrylate, Polysthylenerglycol monochrome (meta) acrylate, polypropylenerglycol monochrome (meta) acrylate, Alyl alcohol, an isoconic acid, a crotonic exid, abyl glycidyl ether, dimethylaminochyl (metal) acrylate, when the suffered continuous co er which has the functional group used in this invention 5, for example, has

others may be carried out.
[0077] Although it is not limited especially as reaction temperature of graft polymerization reaction time in case the graft polymerization layer which has the above-mentioned functions group is made to form, the viewpoint of the viscosity of reaction time or a system to 30-100 degrees C are desirable.

degrees C are desirated.

(D078) Moreover, although not limited especially as a solvent of graft polymerization reaction time, the mixed stock of the water independent from a soluble viewpoint of the abover-mention oxidizer or water, and a polar organic solvent is desirable. The same thing as the polar organic solvent which it was not limited especially as the above-mentioned polar organic solvent example, was illustrated in explanation of this invention 2 etc. is mentioned.

sowerk which it was not assess of the service of the solution of the service of t ding to the need for a reaction

according to the need for a reaction.

[0081] This invention 6 by making an oxidizing agent react to the perticle which has a reducibility radical on a front face, making the above-mentioned particle front face generate a radical, and making the polymerization nature monomer which has a functional group with this radical as the starting point react. The graft polymerization layer which has a functional group in made to form in the above-mentioned particle front face. Further By making the polymerization nature monomer which has an epoxy group react to it, after introducing the active group which has a polymerization nature wing group and/or polymerization initiation ability into the graft polymerization layer which has the above-mentioned functional group. It is the spacer for flouid crystal display components characterized by making it come to form the graft polymerization layer which has an epoxy group in the graft polymerization layer shich has an epoxy group in the graft polymerization layer front face which has the reducibility radical used in this invention 6 on a front face is the same as that of the particle which has the reducibility radical explained in full detail in

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran web cgi ejie

JP.11-223821.A [DETAILED DESCRIPTION]

12/32 ページ

the same as that of the particle which has the reducibility radical explained in full detail in explanation of this invention 1 on a front face. The oxidizer used in this invention 7 is the same as the oxidizer explained in full detail in explanation of this invention 1. [0092] The graft polymerization layer which has a functional group in this invention 7 is the same

orization layer which has the functional group explained in full detail in

as the graft polymerization layer which has the functional group explained in full detail in explanation of this invention 5.

[0093] In this invention 7, the active group which has a polymerization nature viryl group and/or polymerization initiation ability is introduced into the graft polymerization layer which has the sover-mentioned functional group. The approach of introducing a polymerization rature viryl group into the graft polymerization layer which has the above-mentioned functional group is the same as the approach explained in full detail in explanation of the spacer for liquid crystal display components of this invention 6.

[0094] The approach of prints during the active group which has polymerization initiation shifty

[0094] The approach of introducing the active group which has polymerization initiation ability

[0094] The approach of introducing the active group which has polymerization initiation ability into the graft polymerization layer which has the above-mentioned functional group is the same as the approach explained in full detail in explanation of this invention 6. [0095] After introducing the active group which has the active group and/or polymerization initiation ability which have the above-mentioned polymerization nature viryl group into the graft polymerization layer which has the above-mentioned functional group, the polymerization nature monomer which has a long-chain sluly group is made to react to it further in this invention 7. [0096] The polymerization nature monomer which has the long-chain albyl group used in this invention 7 is the same as the polymerization nature monomer which has the long-chain albyl group explained in full detail in explanation of this invention 4.

swertoon / is the same as the polymerization nature monomer which has the long-chain alkyl group explained in full detail in explanation of this invention 4.

[0097] Moreover, in addition to the polymerization nature monomer which has the abovementioned long-chain alkyl group, and the monomer of copolymerization nature monomer which has the abovementioned long-chain alkyl group, and the monomer of copolymerizable others may be carried out. What was illustrated as the polymerization nature monomer which is not inimited especiably as the above and other monomers, for example, has an epoxy group in explanation of the spacer for liquid crystal display components of this invention 2, and a monomer of copolymerizable others, the same thing, etc. are mentioned.

[0098] Two glass substrates with which the orientation film and a transparent electrode have been arranged this invention 8. The spacer for liquid crystal display components of this invention 5. The spacer for liquid crystal display components of the invention 5. The spacer for liquid crystal display components of the invention 5. The spacer for liquid crystal display components of the invention 5. The spacer for liquid crystal display components of the invention 5. The spacer for liquid crystal display components of the invention 5. The spacer for liquid crystal display components of the invention 5.

been arranged this invention 8 The spacer for liquid crystal display components of this invention. I, the spacer for liquid crystal display components of this invention 2. The spacer for liquid crystal display components of this invention 4, the spacer for liquid crystal display components of this invention 4, the spacer for liquid crystal display components of this invention 5, the spacer for liquid crystal display component which counters through the spacer for liquid crystal display component which counters through the spacer for liquid crystal display component of this invention 7 and by which figuid crystal is enclosed between the above-mentioned glass substrates. As the above-mentioned figuid crystal display component, what was shown in drawing 1 is mentioned for example. drawing 1 is mentioned, for example.
[0099]

[0099] [Example] Although an example is hang up over below and this invention is explained to it in more detail, this invention is not limited only to these examples.

[0100] The mixed liquor of the diviny/benzene 100 weight section and the benzoyl-peroxide 2 weight section was added to the 3% water-solution 800 weight section of example 1 (production of the perticle which has a reducibility radical on a front face) polyvinyl alcohol, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification actuation for the obtained perticle after westing. The obtained perticle are mean-particle-diameter =6.0micrometer and CV value =5, and performed the next actuation by making this particle into a seed particle child.

seep percese crisic.
[0101] (Production of the perticle which has a polymerization layer) the seed perticle child 5
weight section obtained by the separable flask by the ion-exchange-water 250 weight section
the methyl methacrylate 5 weight section, and the above-mentioned actuation — in addition, water 250 weight section after making SONIXETA distribute enough, it agitated to homogeneity. Nitrogen gas was introduced into the system and churning was continued at 30 degrees C for 3 hours. The second cerium ammonium solution of nitric acid+12.5 weight section of 0.1 mols / L adjusted in the 1-N nitric-acid water solution was added to this, and it reacted to it for 5 hours. Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the sea sception with the 3-micrometer membrane filter. Ethanol and an sections washed this particle anough, and the vacuum dryer performed reduced pressure drying.

[0102] Evaluation and the surface component analysis of the dynamics reinforcement (10% K value) — 420kg/fmcl k; is — Methyl methacopylate existed in the spacer front face as a result of TOF-SIMS analysis.

[0103] (Evaluation of dynamics reinforcement) the particle obtained using the minute compression test machine (PCT-200, Shimadru Corp. make) by the cylinder smooth and face with a diameter [made from a diamond] of 50 micrometers — 0.21g (/second] compression velocity and the maximum trial — too heavy — the compression test was performed by 10g and K value was calculated from the following formula.

R-1 [K = (3/root2) and F-S-3/2 and]/2F: The too heavy value in 10% compression set of a particle (tig)

S: the compression in 10% compression set of a particle — a variation rate (mm)

5: the compression in 10's compression set of a particle — a variation rate (mm).

R. The radius of a particle (mm).

[0104] (Surface component analysis) Time-of-flight mold secondary-ion-mass-spectroscopy equipment (TOF-SIMS) analyzed. According to this equipment, the rate in the polymer which constitutes the front face of each presentation from the number of counts of the mass spectrum which can analyze only the about 0.01-micrometer pole front face of the thickness direction, and is detected in the area section of 0.2-micrometer angle is computable.

is detected in the area section of 02-micrometer angle is computable.

[0105] The same actuation as an example 1 was performed except having used the laurylacrylat 8 weight section for composition of the perticle which has an example 2 polymerization layer instead of methyl methacrylate as a polymerization nature monomer. The spacer was evaluated using this particle, a result.—dynamics reinforcement (10% K value)—420kg/mm2 it is — laurylacrylate existed in the spacer front face as a result of TOF-SIMS analysis.

[0108] The same actuation as an example 1 was performed except having used the hydroxy methacrylate 5 weight section for composition of the particle which has an example 3 polymerization layer instead of methyl methacrylate as a polymerization nature monomer. Abdroxyethyl methacrylate valued 1 for 10°-SIMS analysis. polymerization layer instead of methyl methacrylate as a polymerization nature monomer. Hydroxyethyl methacrylate existed in the spacer front face as a result of TOF-SIMS analysis. [0107] Furthermore, the particle 2 weight section and the toluene 30 weight section which were obtained here were stirred at 80 degrees C in the separable flash, and the Dibouti rutin JIRAURI rate 0.04 weight section was dissolved in this at the toluene 4 weight section, and it added. The propyl isocyanate 5 weight section was dissolved in this at the toluene 5 weight section, and it add, and reacted at 80 degrees C for 8 hours. Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. The sectione washed this particle enough and the vacuum dryer performed reduced onessure dryins.

performed reduced pressure drying (0108) The spacer was evaluated using this particle, a result — dynamics reinforcement (10% value) — 420kg/mm2 it is — the propyl group existed in the spacer front face as a result of

value)— 420kg/mm² it is — the propyl group existed in the spacer front face as a result of TOF-SIMS analysis.

TOF-SIMS analysis.

[0109] The example 4 tetramethylolmethane-triscrylate 60 weight section, the diviny/bonzene 20 weight section, and the acrylonitrile 20 weight section were mixed to homogeneity, the carbon blach 12 weight section was added to this, and homogeneity was made to distribute carbon black over 48 hours using a bead mill. The benzoyt-peracide 2 weight section was mixed into this monomer mixture at homogeneity, and this was further supplied to the 3% water-solution 850 weight section of polyvinyl alcohol. After agitating well and performing grain refining, the temperature up was carried out to 80 degrees C under the ritrogen air current, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles are mean-particle—

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

2007/02/02

JP.11-223821.A [DETAILED DESCRIPTION]

15/32 ページ

[0118] It replaced with example 7 polyvinyl alcohol, and the seed particle child was produced like

[0118] It replaced with example 7 polyvinyl alcohol, and the seed particle child was produced like the example 1 using hydroxyethyl cellulose, and the particle which has a polymerization layer like [it is the same and] an example 1 continuously was produced. The spacer was evaluated using this particle, a result — of paramics reinforcement (10% K value) — 420kg/r/mn2 it is — methyl methacrylate existed in the spacer front face as a result of TOF-SIMS enalysis. [0119] The mixed ideur of the divinylbearcen 100 weight section and the benzoyl-peroxide 2 weight section was added to the 3% water-solution 800 weight section of example 8 (production of the particle which has a reducibility radical on a front face) polyvinyl alcohol, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter -6,0micrometer and CV value =5. When surface analysis was performed in TOF-SIMS, the OH radical of the polyvinyl alcohol origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child. [0120] (Formation of a reactant graft polymerization layer) After adding the seed particle child 5 weight section, obtained by the ion-exchange-water 95 weight section, the glycidyl methacrylate 5 weight section, the methyl methacrylate 5 weight section, and the above-mentioned actuation to the separable flask and distributing it enough by SOMIKETA, it agitated to homogeneity. Nitrogen gas was introduced into the system and chuming was continued at 30 degrees C for 3 hours. The second cerium ammonium solution of nitric scid 10 weight section mixture was taken out after reaction termination and reaction mixture was also most after reaction termination and reaction mixture w

ed out to the particle the ** exception with the 3-micrometer membrane filter. Ethanol and

corried out to the particle the ** exception with the 3-micrometer membrane filter. Ethanol and an acetone washed this particle enough, and the vacuum dryer performed reduced pressure drying. About the obtained particle, the elution test and the adhesive evaluation to Riguid crystal were performed by the following approach. The result was shown in Table 1.

[0122] (Ethion test to liquid crystal) (1g of obtained particles was distributed to liquid crystal (Morch (Co.) make: ZLI-4720-000) 2mL, and it was left at 80 degrees C for 200 hours. Then, liquid crystal was collected and the gas chromatography investigated the purity of fisquid crystal.

[0123] (Adhesion test) it sprinkled to the glass substrate (the Nissan chemistry company make: SANEBA 150 230 degree-Cx 1-hour baking behind a spin cost) which the polyimide orientation flam was applied (glass substrate) and stiffered the obtained particle. After heating this substrate on the temperature conditions of 150 degree-Cx 1 hour for 120 degree-Cx 10 minutes, the air blow trial was cernied out by spraying air for 5 seconds from the distance of 10cm from a substrate from an air gun (3 kg/cm2), and remeasuring the number of the particle which remained, after measuring the particle number within a predetermined visual field with an optical microscope.

[0124] The same actuation as example 9 (production of the particle which has a reducibility reducial on a front face) example 8 was performed.

radical on a front face) example 6 was perfo

radical on a front face) example 8 was performed.

(Formation of a reactant graft polymerization layer) The same actuation as an example 8 was performed except having used hydroxystehyl methacrylate instead of methyl methacrylate. About the obtained particle, the elution test and the adhesive evaluation to liquid crystal were performed like the example 8. The result was shown in Table 1.

[0125] The same actuation as example 10 (production of the perticle which has a reducibility radical on a front face) example 8 was performed.

(Formation of a reactant graft polymerization layer) The same actuation as an example 8 was performed except having used the glycidyl affyl compound ether instead of glycidyl methacrylate, and having used hydroxyethyl methacrylate instead of methyl methacrylate. About the obtained particle, the elution test and the adhesive evaluation to liquid crystal were performed like the example 8. The result was shown in Table 1.

[0126] The same actuation as example 11 (production of the particle which has a reducibility radical on a front face) example 8 was performed.

[0127] (Formation of a reactant graft polymerization layer) After adding the seed particle child 5

diameter =8.0micrometer and CV value =5, and performed production actuation of the particle which has a polymerization layer like an example 1 by making this particle into a seed particle

[0110] The spacer was evaluated using this particle, a result — dynamics rein value) — 420kgf/mm TOF-SIMS analysis. - 420kgf/mm2 it is -- methyl methacrylate existed in the spacer front face as a result of

TOF-SMS analysis.

[0111] The mixed Squor of the diviny/benzene 80 weight section, the hydroxyethyl methacrylate 20 weight section, and the benzoyl-peroxide 2 weight section was added to the example 5 surface-active-agent high tenor's N-08 (Dai-loh's Kogyo Seiyaku Co., Ltd. make) 3% watersolution 800 weight section, it agitated with the homogenizer, and grain refining was performed. The temperature up was cernied out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Thermion acchange water and a methanol performed classification actuation for the obtained particles after washing. The obtained particles are mean-particle-diameter =8.0micrometer and CV value =5, and performed production actuation of the particle which has a polymerization layer like an example 2 by making this particle into a seed particle child. particle into a seed particle child. [0112] The specer was evaluated using this particle, a result — dynamics reinforcement (105 K

was evaluated using this particle, a result — dynamics reinforcement (10% K value) — 400kgf/mm2 it is — burylacrylate existed in the spacer front face as a result of TOF-SIMS analysis.

SIMS analysis.

[0113] The seed particle child 5 weight section obtained in the 10% hydrogen-peroxide-solution

60 weight section, the sectione 70 weight section, and the example 1 was put into example 6

separable flash, and it stirred for 30 minutes, and the methyl methacrylate 5 weight section and

the iron-sulfate 7 hydrate 20 weight section were added to this, and it stirred at 50 degrees C

for 3 hours. Resction minture was taken out after resction termination and reaction minture was

carried out to the particle the ** exception with the 3-micrometer membrane filter. Ethanol and

an exctone washed this particle enough, and the vacuum dryer performed reduced pressure

drying.

an sections weathed this particle enough, and the vacuum dryer performed reduced pressure drying.

[0114] The spacer was evaluated using this particle, a result — dynamics reinforcement (10% K value) — 420kg/mm² it is — methyl methacrylate existed in the spacer front face as a result of TOF-SIMS enalysis.

[0115] R replaced with example of comparison 1 polyvinyl alcohol, and the seed particle child was produced using the surfactant high tenor N-08 (Dai-lohi Kogyo Seiyaku Co., Ltd. make), and the particle which has a polymerization layer like an example 1 continuously was produced. The spacer was evaluated using this particle, a result — dynamics reinforcement (10% K value) — 420kg/mm² it is — the drivinylbenzerse existed in the spacer front face as a result of TOF-SIMS enalysis, and existence of methyl methacrylate of several pascer front face as a result of TOF-SIMS enalysis, and existence of methyl methacrylate 5 weight section obtained in the ion-exchange-water 200 weight section, the methyl methacrylate 5 weight section obtained in the ion-exchange-water 200 weight section, the methyl methacrylate 5 weight section and the example 1 to example of comparison 2 separable flash and distributing it enough by SONIKETA, it agisted to homogeneity, Nitrogen gas was introduced into the system and churning was continued at 30 degrees C for 3 hours. Benzoyl-peroxide 0.1 weight section addition was carried out, and it reacted to this for 5 hours. Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the sex exception with the 3-micrometer membrane filter. Ethanol and an acetone washed this particle enough, and the vacuum dryer performed reduced pressure drying. The spacer was evaluated using this particle, a result — dynamics reinforcement (10% K value) — 420kg/mm² it is — the divinylbenzene existed in the spacer front face as a result of TOF-SIMS analysis, and existence of methyl methacrylate was not able to be checked.

[0117] The same actuation as an example 1

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

2007/02/02

JP.11-223821.A [DETAILED DESCRIPTION]

16/32 ページ

weight section obtained by the ion-exchange-water 100 weight section, the isopropyl alcohol 30

weight section obtained by the ion-exchange-water 100 weight section, the isopropyl elcohol 30 weight section, the glycidyl methacrylate 45 weight section, and the abover-mentioned actuation to the separable flash and distributing it enough by SONIKETA, it agitated to homogeneisy. Furthermore, it stirred by adding the emmonium persuffate 0.15 weight section and the sodium-hydrogensulfite 0.003 weight section, and making it fully dissolve. The system was once decompressed with the purp, nitrogen gas was introduced after that, and stirring was continued for 30 minutes. The temperature up of this was carried out to 50 degrees C, and the reaction was continued for 2 hours. The system was cooled 2 hours after, the tetrahydrofuran 100 weight section and fittle hydroquinone were added, and the reaction was stopped.

[0128] Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle be ## acception with the 3-micrometer membrane filter. This particle was enough washed in the tetrahydrofuran and the vacuum dryer performed reduced pressure drying. About the obtained particle, the elution tests and the adhesive evaluation to fixed crystal were performed like the example 8. The result was shown in Table 1.

[0129] The example 12 (production of particle which has reducibility radical on front face) trimethylolyropane-triscrytate 50 weight section, the diviny/benzene 40 weight section, and the acrylonitrile 10 weight section were mixed to homogeneity, the carbon black 12 weight section was added to this, and stirring was performed for 48 hours using the bead mill. The berozot-peroxide 2 weight section was mixed into this monomer mixture at homogeneity, and this was further suppled to the 3% water-solution 550 weight section of polyvinyl alcohol. After stirring enough and performing grain refining under the nitrogen air current, thours, hot water and a methanol performed classification actuation for the obtained particle after washing. The obtained particle serve mean-particl

checked on the front face. The next actuation was performed up many an example 8 particle child.

[0130] (Formation of a reactant graft polymerization layer) The same actuation as an example 8 was performed. About the obtained perticle, the elution test and the adhesive evaluation to liquid crystal were performed like the example 8. The result was shown in Table 1.

[0131] The mixed liquor of the diviny/benzene 80 weight section, the hydroxyethyl methacry/late 20 weight section, and the benzyor/pervised 2 weight section was added to the example 13 (production of particle which has reducibility radical on front face) surface-active-agent high tenor's N-09 (Dar-lich Kopy Seriyaku Co., Ltd. make) 3% water-activition 800 weight section, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter =8.0micrometer and CV value = 5.0. When surface analysis was performed in TOF-SIMS, the OH radical of the hydroxyethyl methacrylate origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child.

[0132] (Formation of a reactant graft polymerization layer) The same actuation as en example 8

sctustion was performed by making this particle into a seed particle child.

[0132] (Formation of a reactant graft polymerization layer) The same actuation as an example 8 was performed. About the obtained particle, the elution test and the adhesive evaluation to fiquid crystal were performed like the example 8. The result was shown in Table 1.

[0132] The mixed liquor of the diviny/betznere 100 weight section and the benzoyl-peroxide 2 weight section was added to the 3% water-solution 800 weight section of example of comparison 4 polyminy lachorul, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen eir current, agitating after that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were meam-particle-diameter =8.0micrometer and CV value =5.0. About the obtained particles, the edution test and the edution to figuid crystal were performed like the example 8. The result was shown in Table 1.

[0134] 80 get particles obtained in the example 4 of example of comparison 5 comparison was

[0134] 80g of particles obtained in the example 4 of example of comparison 5 comparison was

mixed in the alcoholic solvent, and 5g of 0.2-micrometer methyl methacrylate-glycidyl methacrylate oppolymerization particles was made to stick to them. This was made to cover heat treatment and the particle which has a reaction tayor was compounded. About the obtain particle, the elution test and the adhesive evaluation to liquid crystal were performed like the example 8. The result was shown in Table 1.
[0135]

	利品物の検索(X) 打39による配品の検索(X)	179- 被数据管理 (%)
実施例3	100	90
双斑灰?	100	9.5
実施的16	100	
実施押しま	100	9.8
双距射12	100	90
東株円 13	100	**
比較例4	100	35
比較例5	99. 5	90

[0136] The mixed liquor of the diviny/benzene 100 weight section and the benzoyl-peroxide 2 weight section was added to the 3% water-solution 800 weight section was added to the 3% water-solution 800 weight section was added to the 3% water-solution 800 weight section was grained as a reducibility redical on a front face) polyvinyl alcohol, it agistated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agistating after that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed treaction actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter =8.0micrometer and CV value =5. When surface analysis was performed in TOF-SIMS, the OH radical of the polyvinyl alcohol origin was checked on the front face. The next actuation was performed by making this particle into a seed particle. ribid.

[0137] (Formation of a reactant graft polymerization tayor) the seed particle child 5 weight section, the store seed of the polyvinyl methacrylate 5 weight section, the methory polyethylene-glycol more-methacrylate (rumber of ethylene glycol units = 9) (Rippon Oil & Fets make-MA-400) 5 weight section, and the above-mentioned actuation — in addition, after making SOMIKETA distribute enough, it agisted to homogeneity. Nitrogen gas was introduced into the system and churning was continued at 30 degrees C for 3 hours. The second cerum ammonium solution of nitrio scid 10 weight section of 0.1 mol/L was added to this, and it reacted to it for 5 hours.

[0138] Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle enough, and the vacuum dryer performed filter. Ethanol and an actone washed this particle enough, and the vacuum dryer performed filter. Ethanol and an actone washed this particle enough, and the vacuum dryer performed filter the example 1. and the alchoin test and the adhesive evaluation to liquid cry

example 8. The result was shown in Table 2.
[0139] The same actuation as example 15 (production of the perticle which has a reducibility radical on a front face) example 14 was performed.
[0140] (Formation of a reactant graft polymerization layer) The same actuation as an example 14 was performed except having used methosy polyethylener-glycol mono-methacrylate (the number of ethylene glycol units = 9) (thoppen 03 & Fats make-MA- 4000) instead of methoxy polyethylener-glycol mono-methacrylate (the number of ethylene glycol units = 9) (thippen 03 & Fats make-MA- 400). About the obtained particle, dynamics reinforcement was evakuated like the example 1, and the elution test and the adhesive evakuation to liquid crystal were performed like the example 8. The result was shown in Table 2.

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

2007/02/02

JP.11-223821.A [DETAILED DESCRIPTION]

19/32 ページ

ectuation was performed by making this particle into a seed particle child. (0.149) (Formation of a reactant graft polymerization layer) The same actuation as an example 14 was performed. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and the elution test and the adhesive evaluation to liquid crystal were performed like the example 8. The result was shown in Table 2.
[0150] The mixed liquor of the diviny/benzene 100 weight section and the benzoyl-

the example 8. The result was snown in Isole 2.

[150] The mixed liquor of the divryibenziere 100 weight section and the benzoyf-peroxide 2 weight section was added to the 3% water-solution 800 weight section of example of comparison 6 polyvinyl alcohol, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification settuation for the obtained particle after washing. The obtained particles were mean-particle-diameter =0.0micrometer and CV value =5.0. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and the elution test and the adhesive evaluation to liquid crystal were performed like the example 6. The result was shown in Table 2.

[0151] 80g of particles obtained in the example 6 of example of comparison 7 comparison was mixed in the alcoholic solvent, and 5g of 0.2-micrometer methoxy polysthylenergylor monomethacrylate (number of ethylene glycol units = 9) (Nippon Ol & Fats make-MA- 400)-glycidyl methacrylate (number of ethylene glycol units = 9) (Nippon Ol & Fats make-MA- 400)-glycidyl methacrylate copolymerization particles was made to strick to them. This was made to cover with heat treatment and the particles which has a reaction layer was compounded. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and the elution test and the adhesive evaluation to liquid crystal were performed like the example 8. The result was shown in Table 2.

Table 2.

[0152] The mixed liquor of the glycidyl methacrylate 50 weight section, the methoxy polyethylene-glycol mono-methacrylate (number of ethylene glycol units = 9) (Nippon Oil & Fats make-MAR- 400) 50 weight section, and the benzoyl-peroxide 2 weight section was added to the example of comparison 8 surfactant high tenor's N-08 (Dail-lchi Kogyo Selyaku Co., Ltd. make) 33 water-solution 800 weight section, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Hot water and a methanol performed classification scuttation for the obtained perticle after washing. The obtained perticles were mean-particle-diameter =6 finicrometer and CV value =5.0. About the obtained particle. memics reinforcement was evaluated like the example 1, and the elution test and the adhesiv raluation to liquid crystal were performed like the example 8. The result was shown in Table 2. (0153) (Table 2)

	力學強度 (K 1 0 能)	総品店出試験 介知による後品の 観度(X)	付着性 パカ・放験 政策率 (3)
突旋押14	450	100	9.0
実施例15	450	100	91
突盖州16	450	100	8.5
英族男17	450	100	90
東施押10	450	100	9.3
突旋列19	450	100	90
比較何6	450	100	3.5
比較例7	450	99. 5	90
比較何 8	製化なに名物	100	50

[0154] The mixed liquor of the diviny/benzene 100 weight section and the benzoyl-peroxide weight section was added to the 3% water-solution 800 weight section of example 20 (produ of the particle which has a reducibility radical) polyvinyl alcohol, it agisted with the homogeneous control of the particle which has a reducibility radical) polyvinyl alcohol, it agisted with the homogeneous control of the particle which has a reducibility radical) polyvinyl alcohol.

[0141] The same actuation as example 16 (production of the particle which has a reducibility radical on a front face) example 14 was performed.
[0142] (Formation of a reactant graft polymerization tayer) The same actuation as an example 14 was performed except having used the glycidyl alph compound either instead of glycidyl methecrylate. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and the elation test and the adhesive evaluation to fiquid crystal were performed like the example 8. The result was shown in Table 2.
[0143] The same actuation as example 17 (production of the particle which has a reducibility radical on a front face) example 14 was performed.
[0144] (Formation of a reactive reaft polymerization layer) the send particle child 5 weight

radical on a front face) example 14 was performed.
[0144] (Formation of a reactant graft polymerization layer) the seed particle child 5 weight section, otherwised by the separable flash by the ion-rachange-water 100 weight section, the isopropyl alcohol 30 weight section, the gholidy methacrysta 40 weight section, the methoxy polyethylener glycol mono-methacrylate (number of athylene glycol units = 9) (Nippon Oil & Fats make-MA- 400) 10 weight section, and the above-mentioned actuation — in addition, after making SDNIKETA distribute enough, it agisted to homogeneity. Furthermore, it stirred by adding the ammonium porsilate 0.15 weight section and the addian-hydrogensafite 0.003 weight section, and making it fully dissolve. The system was once decompressed with the pump, nitrogen gas was introduced after that, and stirring was continued for 30 minutes. The temperature up of this was carried out to 50 degrees C, and the reaction was continued for 2 hours. The system was cooled 2 hours after, the tetrahydrofuran 100 weight section and little hydroguinen were added, and the reaction was stopped.

[0145] Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. This particle was enough washed in the tetrahydrofuran and the vacuum dryer performed reduced pressure drying. About the obtained particle, dynamics renforcement was evaluated file the tetrahydrofuran and the elaborier performed frequency for the start of the sidesive evaluation to figure or performed reduced pressure

dying. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and the elation test and the adhesive evaluation to liquid crystal were performed like the example 8. The result was shown in Table 2. [0148] The example 18 (production of particle which has reducibility radical on front face) trimethylolpropane-trieorylate 50 weight section, the divinybenzene 40 weight section, and the acrylonitrile 10 weight section were mixed to homogeneity, the carbon black 12 weight section was added to this, and stirring was performed for 48 hours using the bead mill. The boruzyl-percivide 2 weight section was mixed into this monomer mixture at homogeneity, and this was further supplied to the 3% water-solution 850 weight section of polyvinyl slochol. After stirring enough and performing grain enfining, under the nitrogen air current, the temperature up was carried out to 80 degrees C, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-dismeter =0.0micrometer and CV value =5.0, and were black. When surface analysis was performed in TOF-SIMS, the OH radical of the polyvinyl alcohol origin was checked on the front face. The next actuation was performed by mixing this particle into a seed checked on the front face. The next actuation was performed by making this particle into a seed particle child.

particle child.

[0147] (Formation of a reactant graft polymerization layer) The same actuation as an example 14 was performed. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and the elation test and the schesive evaluation to liquid crystal were performed like the example 1. The result was shown in Table 2.

[0148] The mixed liquor of the diviny/benzene 80 weight section, the hydroxyethyl methacrylate 20 weight section, and the benzoyl-peroxide 2 weight section was added to the example 19 chroduction of particle which has reducibility radical on front face) surface-active-agent high tenor's N-08 (Dai-lohi Kogyo Seiyaku Co., Ltd. make) 3% water-solution 800 weight section, it agistated with the homogenizor, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained perticle after washing. The obtained particles were mean-particle-disanted obtained particle after washing. The obtained particles were mear-particle-diameter =8.0micrometer and CV value =5.0. When surface analysis was performed in TOF-SIMS, the OH radical of the hydroxyethyl methacrylate origin was checked on the front face. The next

http://www4.ipdl.ncipi.go_ip/cgi-bin/tran_web_cgi_ejje

2007/02/02

JP.11-223821,A [DETAILED DESCRIPTION]

20/32 ページ

and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter = 60 micrometer and CV value = 5. When surface analysis was performed in TOF-SIMS, the OH radical of the polyvinyl alcohol origin was checked on the front face. The next actuation was performed by maki

cerum ammonaum solution of nitrio acid 10 weight section of 0.1 mobs / L adjusted in the 1-N nitric-acid water solution was added to this, and it reacted to it for 5 hours.

[0156] Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. Ethanol and an acetone washed this particle enough, and the vacuum dryer performed reduced pressure drying. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and the orientation condition was evaluated by the following approach. The result was shown in Table 3.

Table 3.

[0157] [Evaluation of an orientation condition) The obtained particle was sprinkled, the substrate size { of 50x50mm } and cel gap 8.0micrometer STN mold liquid crystal display was produced, it is the following, and the orientation condition of liquid crystal was made and evaluated. The

size [of 50x50mm] and cel gap 8 0micrometer STN mold liquid crystal display was produced, it is the following, and the orientation condition of fiquid crystal was made and evaluated. The observation comparison of the initial state (condition impressed to equipment AG3V after cel production) and electrical-potential-difference impression condition (condition which impressed the electrical-potential-difference of 400Hz and AG5VV for 5 seconds, and impressed it to equipment AG3V after that) of a liquid crystal display was carried out with the polarization microscope, and when it shone around a particle and an omission occurred after electrical-potential-difference impression, it was estimated as abnormality orientation generating. [0158] The same actuation as example 21 (production of the particle which has a reducibility radical on a front face) example 20 was performed.

(Formation of the graft polymerization layer which has a long-chain alkyl group) The same actuation as an example 20 was performed except having used octyl methacrylate instead of laurylacrylate. It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 2.0 The result was shown in Table 3.

[0159] The same actuation as example 22 (production of the particle which has a reducibility radical on a front face) example 20 was performed.

[0160] (Formation of the graft polymerization layer which has a long-chain alkyl group) the seed particle child 5 weight section obtained by the separable flash by the ion-exchange-water 50 weight section, the isospropyl alcohol 80 weight section, the stearyl methacrylate 45 weight dissolven, the isospropyl alcohol 80 weight section, the stearyl methacrylate 45 weight dissolven. The system was conce decompressed with the pump, nitrogen gas was introduced after that, and stirring was continued for 20 minutes. The temperature up of this was carried out to 50 degrees C, and the resection was continued for 2 hours. The system was cooled 2 hours after, t

support.

(0181) Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. This particle was enough washed in the tetrahydrofuran and the vacuum dryer performed reduced pressure drying. It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 20. The result was shown in Table 3.

[0162] The example 23 (production of particle which has reducibility radical on front face)

sane-triscrylate 50 weight section, the divinylbenzene 40 weight sectio trimethylobropane-triscrylate 50 weight section, the divinybanzene 40 weight section, and the acrylositrial of loweight section were mixed to homogeneity, the carbon black 12 weight section was added to this, and stirring was performed for 48 hours using the bead mill. The benzoyl-peruside 2 weight section was mixed into this menomer mixture at homogeneity, and this was further supplied to the 33 wester-solution 850 weight section of polyrinyl stochol. After stirring enough and performing grain refining, under the nitrogen air current, the temperature up was carried out to 80 degrees C, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter =50 enicrometer and CV value =5.0, and were black. When surface enabysis was performed in TOF-SDMS, the OH redical of the polyrinyl slochol origin was checked on the front face. The next actuation was performed by making this particle into a seed particle chair. rticle child.

(0.163) (Formation of the graft polymerization layer which has a long-chain alkyl group) The same actuation as an example 20 was performed. It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 20. The result was shown in Table 3.

shown in Table 3. [0164] The mixed liquor of the divinylbenzene 80 weight section, the hydroxysthyl methacrylat 20 weight acction, and the benzoyl-peroxide 2 weight acction was added to the example 24 production of particle which has reducibility radical on front face) surface-active-agent high tenor's N-08 (Dai-Ichi Kogyo Seiyaku Co., Ltd. make) 35 water-solution 800 weight acction, it agitated with the homogenizer, and grain refining was performed. The temperature up was carrent to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Hot water and a methanol performed classification accusation for the personned for 19 notes, not waster and a merunen personned cassinization sociation for the obtained particle after washing. The obtained particles were mean-particle-diameter =8,0micrometer and CV value =5.0. When surface analysis was performed in TOF-SIMS, the OH radical of the hydroxyethyl methacrylate origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child.

[0165] (Formation of the graft polymerization layer which has a long-chain alkyl group) The same actuation as an example 20 was performed. It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 20. The result was

[0166] The mixed liquor of the divinvibenzene 100 weight section and the benzovi-peroxide 2 [0168] The mixed liquor of the diviny/benzene 100 weight section and the benzoyl-peroxide 2 weight section was added to the 3% water-polution 800 weight section of example of comparison 9 polyvinyl slochol, it agitated with the homogenizer, and grain refining was performed. The temperature up was cervised out to 80 degrees C under the nitrogen air current, agitating effort that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification extustion for the obtained particles after washing. The obtained particles were mean-particle-disanter = 8.0micronweter and CV value = 5. It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 20. The result was shown in Table 3.

[0167] The mixed liquor of the diviny/benzene 20 weight section, the stearyl methacrylate 80

[0167] The mixed liquor of the diviny/benzene 20 weight section, the stearyl methacrylate 80 weight section, and the benzoyf-peroxide 2 weight section was added to the example of comparison 10 surface-scrive-agent high tenor's N-08 (Dai-lehi Kogyo Serylatu Co., Ltd. make) 35 water-solution 800 weight section, it stirred with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification sclustion for the obtained particle after washing. The obtained particle series mean-particle-diameter =8.0 micrometer and CV value =3. At evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained jan example 20. The result was shown in Table 3. [0168] The same actuation as example of comparison 11 (production of the particle which has a reducibility radical on a front face) example 20 was performed. (Formation of a graft polymerization layer) The same actuation as an example 20 was performed except having used the methyl methacrylate 10 weight section instead of laurylacrylate. It

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

2007/02/02

JP.11-223821.A [DETAILED DESCRIPTION]

23/32 ページ

an example 25 was performed.

[0175] (Reaction of a long-chain alkyl compound) the particle 5 weight section obtained by the separable flask by the tetrahydro HIRAN 150 weight section, the triethylamine 20 weight section, and the above-mentioned actuation — in addition, after making SONINETA distribute enough, it strend to homogeneinty. Subsequently, the solution which melted the stearin said chloride 10 weight section in the tetrahydrofuran 20 weight section was dropped at the system. The system was kept at 30 degrees C, it strend for 3 hours, and the reaction was continued.

[0176] Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. The tetrahydrofuran and the methanol washed this particle enough, and the vacuum dree performed reduced pressure drying. It evaluated about dynamics reinforcement and an orientation condition as well as I particle / which was obtained 3 an example 25.

[0177] The same actuation as example 27 (production of the particle which has a reducibility radical on a front face) example 25 was performed.

[Formation of the graft polymerization layer which has a functional group) The same actuation as an example 25 was performed except having used the methacrylic-acid 10 weight section obtained by the separable flask by the tokene 60 weight section, the triethylamine I weight section, and the above-mentioned actuation — in addition, after making SONIKETA distribute enough it stirred to homogeneity. Subsequently, the solution within method the stearyl psicioly 10 weight section, and the above-mentioned actuation — in addition which method the stearyl psicioly 10 weight section in the tokenen 10 weight section was dropped at the system. The system was stirred under reflux temperature for fine terms and the method was expected.

the toluene 10 weight section was dropped at the system. The system was stirred under reflux

the tolurne 10 weight section was dropped at the system. The system was stirred under refit temperature for 6 hours, and the reaction was continued.

[0179] Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. Tolurne a methanol washed this particle enough, and the vacuum dryer performed reduced pressure drying. It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 25. The result was shown in Table 4. [0180] The same actuation as example 28 (production of the particle which has a reducibility radical on a front face) example 25 was performed.

[1811] [Commission of the experience place which has a functional group the send.

[0181] (Formation of the graft polymerization layer which has a functional group) the sec [0181] (Formation of the graft polymerization layer which has a functional group) the seed particle child 5 weight section obtained by the separable flask by the ion-exchange-water 100 weight section, the isopropyl sloohol 30 weight section, the glycidyl methacryfate 45 weight section, and the above-mentioned actuation — in addition, after making SOMKETA distribute enough, it agistated to homogeneity, Furthermore, it stirred by adding the ammonium persuifate 0.15 weight section and the sodium-hydrogensuiffice 0.003 weight section, and making it dissolve enough. The system was once decompressed with the pump, nitrogen gas was introduced after that, and stirring was continued for 30 minutes. The temperature up of this was carried out to 50 degrees C, and the reaction was continued for 2 hours. The system was cooled 2 hours after, the tetrahydrofuran 100 weight section and little hydroquinone were added, and the reaction was hydrofuran 100 weight section and little hydroquine

00182] Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ⇔ exception with the 3-micrometer membrane filter. This particle was enough washed in the tetrahydrofuren and the vacuum dryer performed reduced pressure

dying.

(0183) (Reaction of a long-chain alkyl compound) the particle 10 weight section obtained by the separable flash by the toluene 60 weight section, the triethylamine I weight section, and the above-mentioned actuation — in addition, after making SONIXETA distribute enough, it stirred to homogeneity. Subsequently, the solution which method the staryl amine 10 weight section in the toluene 10 weight section was dropped at the system. The system was stirred under reflux temperature for 6 hours, and the reaction was continued.

temperature for 8 hours, and the reaction was continued.

[0184] Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. Tokene and a methanol washed this particle enough, and the vacuum dryer performed reduced pressure

husted about dynamics reinforcement and an orientation condition as well as { particle / ch was obtained } an example 20. The result was shown in Table 3. [0169]

	カ学教技 (私 1 0 個)	光度计数量折描
REM 2 0	450	見かられたまで
東海州2 1	450	見子の1年に共享配向党生
末底例3.2	450	ASERREST
実施到23	450	MERAREUT
SER24	400	REPRESET
比较料》	450	拉子全州に見君配向党生
比戦器10	製定時に収 せ	ARRARETY
比喻何1:	450	D7食用以及\$2内食虫

(0170) The mixed Squor of the diviny/benzene 100 weight section and the benzoyf-peroxide 2 weight section was added to the 35 water-solution 800 weight section of susmole 25 (production of the particle which has a reducibility radical on a front face) polyvinyl alcohol, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particler-diameter = 8.0 micrometer and CV value = 5. When surface analysis was performed in TOF-SIMS, the OH radical of the polyvinyl alcohol origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child.

(0171) [Commistion of the graft polymeristion layer which has a functional group) the seed particle child 5 weight section obtained by the separable flast by the ion-sachange-water 95 weight section, the hydroxyethyl methacentylate 10 weight section. And the above-mentioned actuation — in addition, after making SONIXETA distribute enough, it agitated to homogeneity, Nitrogen gas was stroduced into the system and churning was continued at 30 degrees C for 3 hours. The second certium ammonium solution of nitric acid 10 weight section of 10 mols / L agitated in the 1-N nitric-acid water solution was added to this, and it reacted to it for 5 hours. Reaction mixture was taken out after restoin termination and reaction mixture was taken out after restoin termination and reaction mixture was securided to the vacuum dryer performed reduced pressure drying.

(0172) (Reaction of a long-chain allyl compound) the particle 5 weight section on data an acotone was dropped. The temperature up of the system was carried out to 60 degrees C, and the reaction was continued for 5 hours.

(0173) Reaction mixture was taken out after resction termi

drying. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and the orientation condition was evaluated like the example 20. The result was shown in Table

[0174] The same actuation as example 28 (production of the particle which has a reducibility radical on a front face) example 23 was performed. (Formation of the graft polymerization syst which has a functional group) The same actuation as

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

2007/02/02

JP.11-223821.A [DETAILED DESCRIPTION]

24/32 ページ

drying. It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 25. The result was shown in Table 4. [0185] The example 29 (production of particle which has reducibility radical on front face) trimethylopropamentriacrylate 50 weight section, the diviny/benzene 40 weight section, and the trimethylolpropana-triscrylate 50 weight section, the divinybarrane 40 weight section, and the scrylonitrile 10 weight section were mixed to homogeneity, the carbon black 12 weight section was added to this, and stirring was performed for 48 hours using the bead mill. The benzoyl-peroxide 2 weight section was mixed into this monomer mixture at homogeneity, and this was further supplied to the 38 wester-solution 550 weight section of polyvinyl alcohol. After stirring enough and performing grain refining, under the nitrogen air current, the temperature up was carried out to 80 degrees C, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter =50 micrometer and CV value =50, and were black. When surface analysis was performed in TOF-SBMS, the OH radical of the polyvinyl alcohol origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child.

surface analysis was performed in TOF-SIMS, the OH raccas of the ponyruny accura origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child.

[0188] (Formation of the graft polymerization layer which has a functional group) The same actuation as an example 25 was performed.

(Reaction of a long-chain alkyl compound) The same actuation as an example 25 was performed. Revaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 25. The result was shown in Table 4.

[0187] The mixed Squor of the divinybearcen 80 weight section, the hydroxyethyl methacrylate 20 weight section, and the benzoyl-peroxide 2 weight section was added to the example 30 (production of particle which has raduability radical on front face) sarface-active-agent high tenor's N-08 (Dair-Ichi Kogyo Seiyaku Co., Ltd. make) 3% water-solution 800 weight section, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained particles after washing. The obtained particles were mean-particle-diameter =8.0micrometer and CV value =5.0. When surface analysis was performed in TOF-SIMS, the OH radical of the hydroxyethyl methacrylate origin was checked on the front face. The next actuation as an example 25 was performed.

(Reaction of a long-chain alkyl compound) The same actuation as an example 25 was performed. Revaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 25. The result was shown in Table 4.

Ottasetton of a long-chain sikyl compound) The same actuation as an example 25 was performed.
It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 25. The result was shown in Table 4.
[0188] The same actuation as an example 25 was performed except having used hydroxypropyloelulose instead of example 31 (production of the particle which has a reducibility radical on a front face) polyvinyl alcohol. When surface analysis was performed in TOF-SMS, the ON radical of the hydroxypropyleelulose origin was checked on the first face. The next actuation was performed by making this particle into a seed particle child.
[0190] (Formation of the gaft polymerization layer which has a functional group) The same actuation as an example 25 was performed.
[Reaction of a long—thain silvyl compound) The same actuation as an example 25 was performed.
Revaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained) an example 25. The result was shown in Table 4.
[1911] The same actuation as example 25 was performed.
[Formation of a graft polymerization layers) The same actuation as an example 26 was performed except having used propyl acid chloride instead of stearin acid chloride. It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 25. The result was shown in Table 4.
[10192] [Table 4]

[Table 4]

	力学協定(K10億)	党旅行政策評価
共程時25	450	異常配向発生せず
実施 男 2 6	450	HERRREY
党基州27	450	異常記向発生せず
XE#28	450	REEMRETT
KEM2 >	400	REEMPERT
実施押30	426	具体配向発生せず
#883 1	450	ASSERBLET
成世界 1 2	450	共和紀刊党生

[0193] The mixed liquor of the diviny/benzene 100 weight section and the benzoyl-peroxide 2 weight section was added to the 3% water—solution 800 weight section of example 32 (production of the particle which has a reducibility radical on a front face) polyvinyl alcohol, a agitated with the homogenizer, and grain rafning was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification actuation for the obtained particles after washing. The obtained particles were mean-particle-dismeter =8.0micrometer and CV value =5. When surface analysis was performed in TOF-SIMS, the OH radical of the polyvinyl alcohol origin was checked on the front face. The next actuation was

radical of the polyvimyl alcohol origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child. [0194] (Formation of the graft polymerization layer which has a functional group) the seed particle child 5 weight section obtained by the separable flash by the ion-reschanger-water 95 weight section, the hydrorysthyl methacelyste 10 weight section, and the shover-mentioned actuation — in addition, after making SONIXETA distribute enough, it agitated to homogeneity. Nitrogen gas was introduced into the system and churning was continued at 30 degrees Gro 3 hours. The second certiam ammonium solution of nitric acid 10 weight section of 0.1 mols / L adjusted in the 1-N nitric-acid water solution was added to this, and it reacted to it for 5 hours. hours. The second cerium armonium solution of ritric soid 10 weight section of 0.1 mols / L adjusted in the 1-N nitric-soid water solution was added to this, and it reacted to it for 5 hours. Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the **e exception with the 3-micrometer membrane filter. Ethanol and an acetone washed this particle snough, and the vacuum dryer performed reduced pressure drying. [0195] (Installation of a polymerization nature viryl group) the particle 5 weight section obtained by the tokene 100 weight section and the above-mentioned actuation by the separable flask—in addition, after making SONIKETA distribute enough, it stirred to homogeneity. Furthermore, the JIRALRIN soid in-hught in 0.05 weight section distude with the tokene 10 weight section may added, and it stirred enough. The methacryloryethyl isocyanate 5 weight section disted with the tokene 10 weight section was droped here, the temperature up of the system was carried out to 80 degrees C after dropping termination, and the reaction was continued for 5 hours. Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the **e acception with the 3-micrometer membrane filter. Ethanol and an acotone washed this particle enough, and the vacuum dryer performed reduced pressure drying. [0196] (Formation of the graft polymerization layer which has an epony group) the particle 5 weight section obtained by the separable flask by the tokene 50 weight section, the glycidyl methacrytate 50 weight section, and the above-mentioned actuation—in addition, after making SONIKETA distribute enough, it stirred to homogeneity. Nitrogen gas was introduced into the system and stirring was continued at 30 degrees C for I hour. Subsequently, the temperature up of the system was carried out to 80 degrees C for I hour. Subsequently, the temperature up of the system was carried out to 80 degrees C for I hour. Subsequently, the temperature up

http://www4.ipdl.ncipi.go.ip/cgi-bin/tran web cgi eile

2007/02/02

JP.11-223821.A [DETAILED DESCRIPTION]

27/32 ページ

the tetrahydrofuran 100 weight section and little hydroquinone were a stopped. Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. This particle ed in the tetrahydrofuran and the vacuum dryer performed reduced pr

crying. (2022) (Installation of a polymerization nature viryl group) the particle 5 weight section obtained by the toluene 80 weight section and the abover-mentioned actuation by the separable flask edition, after making SONIRETA distribute enough it strived to homogeneity. Furthermore, the methacrylic-acid 5 weight section dixted with the toluene 10 weight section was added, and it stirred enough. Subsequently, the temperature up of the system was carried out to 80 degrees C, and the reaction was continued for 5 hours. Reaction mixture was taken out after reaction

surred enough. Subsequency, whe temperature up or the system was carried out to du orgress C, and the reaction was continued for 5 hours. Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. Ethanol and an acctone washed this particle enough, and the vacuum dryer performed reduced pressure drying.

[2023] (Formation of the graft polymerization layer which has an epoxy group) The same actuation as an example 32 was performed. About the obtained particle, dynamics reinforcement was evaluated like the example 32 was performed. About the obtained particle, dynamics reinforcement was evaluated like the example 8. The result was shown in Table 5.

[2024] The example 36 (production of particle which has reducibility radical on front face) trimethylopropane-triscrytate 50 weight section, the divery/benzene 40 weight section, and the acrylonitrile 10 weight socion were mixed to homogeneity, the carbon black 12 weight section was added to this, and stirring was performed for 48 hours using the bead mill. The benzoyl-peroxide 2 weight section was mixed into this monomer mixture at homogeneity, and this was further supplied to the 3% water-solution 850 weight section of polyvinyl alcohol. After stirring enough and performing grain refining, under the nitrogen air current, the temperature up was carried out to 80 degrees C, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles are mean-particle-diameter =60-micrometer and CV value =50, and were black. When surface analysis was performed in TOF-SIMS, the OH radical of the polyvinyl alcohol origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child.

(0205) (Formation of the graft polymerization layer which has a functional group) The sa actuation as an example 32 was performed.

actuation as an example 32 was performed. (Installation of a polymerization nature vinyl group) The same actuation as an example 32 was

personness. (Formation of the graft polymerization layer which has an epony group) The same actuation as a example 32 was performed. About the obtained particle, dynamics reinforcement was evakuated like the example 1, and a liquid crystal elution test and adhesive evakuation were performed like the example 8. The result was shown in Table 5.

the example 8. The result was shown in Table 5. (1200) The mixed figure of the divinybenzene 80 weight section, the hydroxyethyl methacrylate 20 weight section, and the benzoyf-percised 2 weight section was added to the example 37 (production of particle which has reducibility radical on front face) surface-ective-agent high tenor's N-08 (Dai-Ichi Kogyo Selyalu Co., Ltd. make) 3% water-solution 800 weight section, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter = 6.0 micrometer and CV value = 5.0. When surface analysis was performed in TOF-SIMS, the OH radical of the hydroxyethyl methacrylate origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child. (1201) (Formation of the graft polymerization layer which has a functional group) The same actuation as an example 32 was performed.

(Installation of a polymerization nature vinyl group) The same actuation as an example 32 was performed.

a particle and toluone were carried out the ** exception with the 3-micrometer membrane fit Toluone and an acetone washed this particle enough, and the vacuum dryer performed reduce pressure drying. About the obtained particle, dynamics reinforcement was availated like the example 1, and a liquid crystal elution test and adhesive evaluation were performed like the example 8. The result was shown in Table 5.

[0197] The same actuation as example 33 (production of the particle which has a reducibility

(Initial Time same accusators as example 32 was performed.

(Formation of the graft polymerization layer which has a functional group) The same actuation as an example 32 was performed.

(Installation of a polymerization nature vinyl group) The same actuation as an example 32 was

(Installation of a polymerization nature viryll group) The same actuation as an example 32 was performed. (Formation of the graft polymerization layer which has an epony group) Instead of the glycidyl methocrysta 50 weight section. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and a liquid crystal elation test and adhesive evaluation were performed like the example 1, and a liquid crystal elation test and adhesive evaluation were performed like the example 8. The result was shown in Table 5.
[1981] The same actuation as example 34 (production of the perticle which has a reducibility radical on a front face) example 12 was performed.
(Formation of the graft polymerization layer which has a functional group) The same actuation as an example 32 was performed.
(Installation of the active group which has polymerization initiation ability) the particle 5 weight section obtained by the separable flash by the dimethylformamide 30 weight section, the triethylamine 5 weight section, and the above-mentioned actuation — in addition, after making SONIDETA distribute enough, it stirred to homogenety. The 4 and 4-actions—on valericacid chloride 5 weight section dissolved in the dimethylformamide 10 weight section was dropped at this. After centrising a reaction for hours, reaction mixture was taken out and reaction mixture was taken out and reaction mixture was taken out and reaction of homes preformed reduced pressure drying. ed reduced pressure drying.

(Formation of the graft polymerization layer which has an epoxy group) the particle 5 weight

Green to the graft polymerization layer which has an epoxy group) the particle 5 weight section obtained by the separable flash by the tokene 50 weight section, the ghycidyl section obtained by the separable flash by the tokene 50 weight section, the methyl methacrylata 20 weight section, the methyl methacrylata 20 weight section, and the above-mentioned actuation — in addition, after making SONIXETA distribute enough, it stirred to homogeneity. Nitrogen gas was introduced into the system and stirring was continued at 30 degrees C for I hour. Subsequently, the temperature up of the system was carried out to 10 degrees C, and the reaction was continued for 7 hours. [0199] Reaction mixture was taken out after reaction termination, and after collecting the homopolymers which have separated with tokene, a particle and tokene were carried out the exception with the 3-micrometer membrane filtar. Tokene and an section washed this particle enough, and the vacuum dryer performed reduced pressure drying. About the obtained particle, dynamics reinforcement was evaluated like the example 3, and a liquid crystal elution test and adhesive evaluation were performed like the example 8. The result was shown in Table 5. [0200] The same actuation as example 32 sep performed. [0201] (Formation of the graft polymerization layer which has a functional group) the seed particle child 5 weight section obtained by the separable flash by the ion-exchange-water 100 weight section, and the above-mentioned actuation — in addition, after making SONIKETA distribute enough, it aplated to homogeneity. Furthermore, it stirred by adding the ammoraum persulfate

section, and the above-mentioned actuation — in addition, after making SONIKE I A distribute onough, it agitated to homogeneity, Furthermore, it stirred by adding the ammonium persulfate 0.15 weight section and the sodium-hydrogencarbonate 0.003 weight section, and making it dissolve enough. A system is once decompressed with a pump, nitrogen gas is introduced afte that, and it is 30-minute stirring *******. The temperature up of this was carried out to 50 degrees C, and the reaction was continued for 2 hours. The system was cooled 2 hours after. after

http://www4.ipdl.ncipi.go.ip/cgi-bin/tran web.cgi eiie

2007/02/02

JP,11-223821,A [DETAILED DESCRIPTION]

28/32 ページ

(Formation of the graft polymerization layer which has an epoxy group) The same actuation as an example 32 was performed. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and a liquid crystal elution test and adhesive evaluation were performed like

like the example 1, and a liquid crystal elution test and adhesive evaluation were performed like the example 8. The result was shown in Table 5. [10208] The mixed liquer of the diverybenzene 100 weight section and the berzoyt-peroxide 2 weight section was added to the 33 water-solution 800 weight section of example of comparist 19 polyviny alcohol, it agitated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen are current, agitating after that, and the reaction was performed for 15 hours. Themion exchange water and a methanol performed classification actuation for the obtained particle after washing. The obtained particle dynamics reinforcement was evaluated like the example 1, and a liquid crystal elition test and exchanges. dynamics reinforcement was evaluated like the example 1, and a liquid crystal elution test and schesive evaluation were performed like the example 1. The result was shown in Table 5. [0209] 80g of particles obtained in the example 13 of example of comparison 14 comparison was mixed in the alcoholic solvent, and 5g of 0.2-micrometer methyl methecrylate-glycidyl methecrylate copolymerization particles was made to stick to them. This was made to cover with heat treatment and the particle which has a reaction layer was compounded. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and a liquid crystal elution test and adhesive evaluation were performed like the example 8. The result was shown in Table

[0210] The mixed liquor of the diviny/benzene 20 weight section, the hydroxyethyl methacrylate [0210] The mixed liquor of the divinylbenzene 20 weight section, the hydroxyethyl methecrylate 80 weight section, and the benzoyl-pervaide 2 weight section was added to the example of comparison 15 surface-active-agent high tenor's N-08 (Dai-Ichi Kogyo Seiyaku Co., Ltd. make) 33 water-solution 800 weight section, it agitated with the homogenizer, and grain refining was performed. The temperature up was certified out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Hot water and a methenol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter =8.0micrometer and CV value =5.0. When surface enalysis was performed in TOF-SMS, the OH radical of the hydroxyethyl methecrylate origin was checked on the frost face. About the obtained natrice themmics reinforcement was evaluated like the the front face. About the obtained particle, dynamics reinforcement was evaluated like the ple 1, and a liquid crystal elution test and adhesive evaluation were ple 8. The result was shown in Table 5.

example 8. The result was shown in Table 5.

(10211) The same actuation as example of comparison 16 (production of the particle which has a reducibility radical on a front face) example 32 was performed.

(Formation of the graft polymerization layer which has a functional group) The same actuation as an example 32 was performed.

(Installation of a polymerization nature vinyl group) The same actuation as an example 32 was

performed. (Formation of the graft polymerization layer which has an epoxy group) instead of glycidyl methacrylate, the same actuation as an example 32 was performed except having considered at the methyl methacrylate 50 weight section. About the obtained particle, dynamics reinforcemen was ovaluated like the example 1, and a liquid crystal solution test and adhesive evaluation were performed like the example 8. The result was shown in Table 5.

	力学協度 (K 1 0 値)	森林市出版 さまなには (水) 乳酸の晶部	代章性 17%・故事 担留字(%)
米施州32	450	100	9.5
攻略終33	450	100	86
双连列34	450	100	80
高級例35	450	100	• 3
双路押36	400	100	94
为是例37	420	100	9.5
比较何13	450	100	3.5
H.129114	460	91. 5	
比吸押15	自定的に収益	100	84
H-0016	450	100	40

[0213] The mixed liquor of the diviny/benzene 100 weight section and the benzoyl-peroxide 2 (UZ13) The mixed leuor of the diverglements IUI weight section and the benzoyl-personal z weight section was added to the 35 water-solution 800 weight section of example 38 (production of the particle which has a reducibility radical on a front face) polyvinyl elochol, it signated with the homogenizer, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for

the homogenizer, and grain refiring was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating efter that, and the reaction was performed for 15 hours. Thermion exchange water and a methanol performed classification sectuation for the obtained particle after washing. The obtained particles were mean-particle-diameter—8.0micrometers and CV value = 5. When surface analysis was performed in TOF-SIMS, the OH radical of the polyrinyl alcohol origin was checked on the front face. The next actuation was performed by making this particle into a seed particle child.

[0214] (Formation of the graft polymerization layer which has a functional group) the seed particle child 5 weight section obtained by the separable flash by the ion-racchange-water 95 weight section, the hydroxyethyl methacrylate 10 weight section, and the above-mentioned actuation — in addition, after making SONIXETA distribute enough, it agisted to homogeneity. Nitrogen gas was introduced into the system and chuming was centimed at 30 degrees 0 for 3 hours. The second cerium ammonium solution of nitric soid 10 weight section of 0.1 mols / L adjusted in the 1-N nitric-soid water solution was added to this, and it reacted to it for 5 hours. Reaction ministure was taken out after reaction termination and reaction ministure was carried out to the particle the ex exception with the 3-micrometer membrane filter. Ethanol and an acctone washed this particle enough, and the vaccum dryer performed reduced pressure drying. [0215] (Installation of a polymerization nature vinyl group) the particle 5 weight section obtained by the toberne 100 weight section was dropped here, the temperature up of the system was carried out to the particle making SONIXETA distribute enough, it stirred to homogeneity. Furthermore, the JIRAURIN acid dirr-butyl tin 0.05 weight section diluted with the tobane 10 weight section was dropped here, the temperature up of the system was carried out to the particle these exception with the "minimum stearyl methecrylate 50 weight section, and the above-mentioned actuation — in addition, after making SONIKETA distribute enough, it stirred to homogeneity. Nitrogen gas was introduced into the system and stirring was continued at 30 degrees C for 1 hour. Subsequently, the temperature up of the system was carried out to 60 degrees C, and the benzoyl-peroxide 0.1

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

2007/02/02

JP.11-223821.A [DETAILED DESCRIPTION]

31/32 ページ

dissolve enough. A system is once decompressed with a pump, nitrogen gas is introduced after that, and it is 30-minute stirring *******. The temperature up of this was carried out to 50 degrees C, and the reaction was continued for 2 hours. The system was cooled 2 hours after, the tetrahydrofuran 100 weight section and little hydroquinone were added, and the reaction was stopped. Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ≈ exception with the 3-micrometer membrane filter. This particle was enough washed in the tetrahydrofuran and the vacuum dryer performed reduced pressure

(228) Installation of a polymerization nature vinyl group) the particle 5 weight section obtained by the tokene 80 weight section and the abover-mentioned actuation by the separable flask — in addition, after making SONIKETA distribute enough, it stirred to homogeneity. Furthermore, the methacrylic-soid 5 weight section diluted with the tokene 10 weight section was added, and it is a subject to the second out to 50 degrees. stirred enough. Subsequently, the temperature up of the system was carried out to 60 degrees C, and the reaction was continued for 5 hours. Reaction mixture was taken out after reaction termination and reaction mixture was carried out to the particle the ** exception with the 3-micrometer membrane filter. Ethanol and an acetone washed this particle enough, and the

recrometer memorane inter. Ethanol and an acetorie washed this particle enough, and the vacuum driver performed reduced pressure drying.

[0227] (Formation of the graft polymerization layer which has a long-chain alkyl group) The same actuation as an example 38 was performed. About the obtained particle, evaluation of dynamics rainforcement and an orientation condition was performed like the example 38. The result was shown in Table 8.

[0228] The example 42 (production of particle which has reducibility radical on front face)

trimethylolpropare-triserylate 50 weight section, the divirylbenzene 40 weight section, and the acrylonitrile 10 weight section were mixed to homogeneity, the carbon black 12 weight section was added to this, and stirring was performed for 48 hours using the bead mill. The benzoylperoxide 2 weight section was mixed into this monomer mixture at homogeneity, and this was further supplied to the 3% water-solution 850 weight section of polyvinyl alcohol. After stirring enough and performing grain refining, under the nitrogen air current, the temperature up was carried out to 80 degrees C, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter =5.0micrometer and CV value =5.0, and were black. When surface analysis was performed in TOF-5988, the OH radical of the polyvinyl alcohol origin was handled on the front fine. The next articulum was nerformed by making this particle into a send trimethylolpropane-triscrylate 50 weight section, the divinylbenzene 40 weight section, and the checked on the front face. The next actuation was performed by making this particle int particle child.

particle child. (0229) (Formation of the graft polymerization layer which has a functional group) The same actuation as an example 38 was performed. (Installation of a polymerization nature viring group) The same actuation as an example 38 was

(Formation of the graft polymerization layer which has a long-chain alkyl group) The same actuation as an example 38 was performed. About the obtained particle, evaluation of dynamics reinforcement and an orientation condition was performed like the example 38. The result was

reinforcement and an orientation condition was performed like the example 38. The result was shown in Table 8. (D230) The mixed liquor of the divinylbenzene 80 weight section, the hydroxyethyl methacrylat 20 weight section was added to the example 43 aurface—active—agent high tenor's N-08 (Dai-Ichi Kogyo Seiyaku Co, Ltd. make) 3% water—solution 800 weight section, it agitated with the homogenizor, and grain refining was performed. The temperature up was carried out to 80 degrees C under the nitrogen air current, agitating after that, and the reaction was performed for 15 hours. Hot water and a methanol performed classification actuation for the obtained particle after washing. The obtained particles were mean-particle-diameter =8.0micrometer and CV value =5.0. When surface analysis was performed in TOF-SIMS, the OH radical of the hydroxyethyl methacrylate origin was checked the front face. The next actuation was performed by making this particle into a seed particle child.

[0231] (Formation of the graft polymerization layer which has a functional group) The same

weight section melted in the toluene 10 weight section was dropped. After continuing a reaction for 4 hours, the benzoyl-peroxide 0.1 weight section further melted in the toluene 10 weight section was dropped, and the reaction was continued for 4 hours.

(0217) Reaction mixture was taken out after reaction termination, and after collecting the homopolymers which have separated with toluene, a particle and toluene were carried out the exception with the 3-micrometer membrane filter. Toluene and an acctone washed this particle particle was the second out the exception with the 3-micrometer membrane filter. Toluene and an acctone washed this particle particle was the second out the second o exception with the 3-micrometer membrane filter. Toluene and an acctone washed this particle enough, and the vacuum dryer performed reduced pressure drying. About the obtained particle, dynamics reinforcement was evaluated like the example 1, and the orientation condition was evaluated like the example 20. The result was shown in Table 6. [D218] The same actuation as example 39 (production of the particle which has a reducibility radical on a front face) example 38 was performed. (Formation of the graft polymerization layer which has a functional group) The same actuation as an example 38 was performed.
(Installation of a polymerization nature viryll group) The same actuation as an example 38 was performed.

percented.

(Q219) (Formation of the graft polymerization byter which has a long-chain alkyl group) The sar actuation as an example 38 was performed except having used the octyl methacrylate 30 weigh section and the methyl methacrylate 20 weight section instead of staryl methacrylate. About the obtained perticle, evaluation of dynamics rainforcement and an orientation condition was

performed like the example 38. The result was shown in Table 5.

(220) The same actuation as example 40 (production of the particle which has a reducibility radical on a front face) example 38 was performed.

(Formation of the graft pohymerization layer which has a functional group) The same actuation as

ne sample 38 was performed group which has polymerization initiation ability) the particle 5 weight section obtained by the separable flash by the dimethylformamide 30 weight section, the triethylamine 5 weight section, and the above-mentioned actuation — in addition, after making triethylamine 5 weight section, and the above-mentioned actuation — in addation, after making SOMDETA distribute enough, it stirred to homogeneity. The 4 and 4-zobis-4-cysno valerio-scid chloride 5 weight section dissolved in the dimethylformamide 10 weight section was dropped at this. After continuing a reaction for 4 hours, reaction mixture was taken out and reaction mixture was carried out to the particle the **exception with the 3-micrometer membrane filter. Dimethylformamide, the methanol, and the acetone washed this particle enough, and the vacuum

Directlyformamide, the methanol, and the acctoring washed this particle enough, and the vacuum dryer performed reduced pressure drying. [0222] (Formation of the graft polymerization layer which has a long-chain alkyl group) the particle 5 weight section obtained by the separable flash by the tolurene 50 weight section, the stearyl methacrylate 50 weight section, and the above-mentioned actuation — in addition, after making SONINETA distribute enough, it stirred to homogeneity. Nitrogen gas was introduced into the system and stirring was continued at 30 degrees C for I hour. Subsequently, the temperature up of the system was carried out to 70 degrees C, and the reaction was continued for 7 hours.

for 7 hours. [0223] Reaction mixture was taken out after reaction termination, and after collecting the homopolymers which have separated with tohunne, a particle and tohunne were carried out the ** exception with the 3-micrometer membrane filter. Tohunne and an acetone washed this particle enough, and the vacuum dryer performed reduced pressure drying, About the obtained particle, evaluation of dynamics reinforcement and an orientation condition was performed like the

evaluation of dynamics rainforcement and an orientation condition was performed like the example 38. The result was shown in Table 6.

[0224] The same actuation as example 41 (production of the particle which has a reducibility radical on a front face) example 38 was performed. [0225] (formation of the graft polymerization layer which has a functional group) the seed particle child 5 weight section obtained by the separable flask by the ion-exchange-water 100 weight section, the isopropyl alcohol 30 weight section, the glycidy methacrystac 45 weight section, and the above-mentioned actuation—in addition, after making SONIKETA distribute enough, it agistated to homogeneity, Furthermore, it strived by adding the ammonium persulfate 0.15 weight section and the sodium-hydrogenearbonate 0.003 weight section, and making it

http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web_cgi_ejje

JP.11-223821.A [DETAILED DESCRIPTION]

32/32 ページ

actuation as an example 38 was performed. (Installation of a polymerization nature vinyl group) The same actuation as an example 38 was

(Formation of the graft polymerization layer which has a long-chain alkyl group) The same actuation as an example 38 was performed. About the obtained particle, evaluation of dynamic reinforcement, and an orientation condition was performed like the example 38. The result was

shown in Table 6.
[0232] The same actuation as example of comparison 17 (production of the particle which has a reducibility radical on a front face) example 38 was performed.

(Formation of the graft polymerization layer which has a functional group) The same actuation as an example 38 was performed.

(Installation of a polymerization nature virul group) The same actuation as an example 38 was

(CR33) (Formstion of the graft polymerization layer which has a long-chain alkyl group) The sar actuation as an example 38 was performed except having used the methyl methacrylate 50 weight section instead of stearyl methacrylate. It evaluated about dynamics reinforcement and an orientation condition as well as [particle / which was obtained] an example 38. The result en in Table 6.

lable 6j		
	力学施度(K 1 0 號)	党並行状態評価
実施 例3 8	450	男変配換発生せず
REM39	450	粒子の1部に異常配向発生
実施例40	450	異な配角発生サブ
突延 男4.1	450	異常配向発生せず
亥施州42	400	其常配向発生せず
党集例4.3	420	具体配向発生せず
比较例17	450	位于全用に異常配向発生

[0235]

[0735] [Effect of the Invention] Functionality, such as abnormality orientation prevention engine performance, is given holding the dynamics reinforcement needed for a spacer, since the spacer for fiquid crystal display components of this invention consisted of an above-mentioned configuration. For this reason, if the spacer for liquid crystal display components of this invention is used, the adhesion of the abnormality orientation phenomenon of liquid crystal and a spacer, spraying nature, etc. can be improved easily, and the liquid crystal display component from which a homogeneous and good image is obtained can be offered.

[Translation done.]

* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1. This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the type section Fig. showing the liquid crystal display component of this invention.

[Description of Notations]

- 1 Seal Member
- 2 Transparence Substrate
- 3 Transparent Electrode
- 4 Orientation Control Film
- 5 Transparence Substrate
- 6 Transparent Electrode
- 7 Orientation Control Film
- 8 Substrate
- 9 Spacer
- 10 Substrate
- 11 Pneumatic Liquid Crystal
- 12 Polarization Sheet
- 13 Polarization Sheet

[Translation done.]